Draft

Environmental Impact Statement

U.S. Highway 93
Hamilton to Lolo
Montana

Prepared for

U.S. Department of Transportation - Federal Highway Administration
State of Montana - Department of Transportation

by

FORSGREN ASSOCIATES, INC.

West Yellowstone, Montana
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PROJECT NO. NH 7-1(64)49
US Highway 93 - Hamilton to Lolo
Control # 2315
Milepost 49.0 to Milepost 83.2
Ravalli and Missoula Counties

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Submitted pursuant to 42 USC 4332(2)(c); 49 USC 303;
Sections 2-3-104 and 75-1-101 MCA; and Executive Orders 11990, 11988, and 12898

US Department of Transportation - Federal Highway Administration
Montana Department of Transportation

Cooperating Agencies:
- US Army Corps of Engineers
- Montana Department of Natural Resources and Conservation

Assisting Agencies:
- US Fish and Wildlife Service
- US Environmental Protection Agency
- US Soil Conservation Service
- Ravalli and Missoula Counties
- Montana Department of Environmental Quality
- Montana Department of Fish, Wildlife and Parks

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5/1/96
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ABSTRACT: The Environmental Impact Statement addresses the impacts of improving transportation in the US Highway 93 corridor between Hamilton and Lolo, Montana. The purpose and need for this project includes increasing the safety of the highway, reducing congestion, accommodating growth and development in the Bitterroot Valley, correcting existing deficiencies, and encouraging environmentally friendly modes of transportation. Alternatives under consideration include "no action", park-and-ride system, transit bus service, passenger rail service, and reconstruction of 55.1 km (34.2 miles) of highway. Reconstruction alternatives include 2-lane modified, 4-lane undivided, 4-lane divided, and 5-lane (center turning lane) configurations. Realignment alternatives were considered in the areas of Silver Bridge and Bass Creek Hill. Potential impacts resulting from the proposed actions have been identified along with the measures to mitigate adverse impacts.

Comments on this Draft EIS are due by **July 19, 1996** and should be sent to Joel Marshik at the address above.

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US HIGHWAY 93 - HAMILTON TO LOLO

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ENVIRONMENTAL IMPACT STATEMENT

SUMMARY OF ENVIRONMENTAL IMPACT STATEMENT

SUMMARY

PROJECT DESCRIPTION

This Draft Environmental Impact Statement (DEIS) and Section 404(b)(1) Evaluation discusses and evaluates the proposal to improve transportation in the US Highway 93 corridor from Hamilton to Lolo, Montana. This corridor traverses a portion of Ravalli and Missoula Counties. The project will start at milepost 49.0 and end at milepost 83.2, for a total project length of 55.1 km (34.2 miles).

US Highway 93 is a highway of "national significance", providing an important transportation link in western Montana for national, international, and local vehicle travel. Within the project corridor it serves as the major arterial through the region.

The project corridor is located in the Bitterroot River Valley, a rural area experiencing an extremely rapid growth (6% annually) as it offers scenic beauty and easy commuting to and from Missoula (the area's major city and economic center). Congestion, inferior present and future levels of service, outdated facilities, safety concerns, and public demand for improvements led to this study of ways to improve transportation in the corridor.

Various alternatives to meet the purposes and needs for the proposed project discussed herein were considered. The alternatives included "no action"; transportation demand management techniques to reduce commuter travel such as bus service, passenger rail service, and car and van-pooling from park-and-ride facilities; and highway reconstruction with various lane configurations.

The preferred alternative as identified by the Advisory Committee and Interdisciplinary Team consists of implementing measures to reduce traffic demand, instituting a combination of restrictive and permissive access control policies to encourage densification of existing growth areas and provide protection for undeveloped areas, and reconstructing the highway predominantly following the existing alignment. Additional driving lanes will be added; thus resulting in a 4-lane, undivided highway in rural areas with the addition of a center turning lane in areas of existing or anticipated development.

Bridges and hydraulic structures will be replaced. Construction of park-and-ride lots to encourage car and van pooling will be added near major intersections and population centers. Other amenities such as turning lanes, full 2.5 m (8 ft) shoulders, pedestrian and bicycle facilities, lighting and curb and gutter in urban areas, etc., will be added as appropriate. Two areas of highway realignment are recommended to meet current standards and avoid adverse environmental impacts.

Formation of a transportation management association (TMA) is already in process to encourage ways to reduce the number of single-occupant vehicles using the highway. This will include public education, coordination of ride-share programs, and management of park-and-ride systems. It is hoped this will provide the impetus for regional TMA's coordinating an area-wide effort to reduce transportation demands.

PURPOSE AND NEED FOR THE PROPOSED ACTION

Several purposes and needs for improving transportation in the corridor have been identified:

- US 93 is a major arterial highway in the regional transportation network. Other major actions in the project area have added emphasis to its important role in the transportation system. Current physical limitations and the high degree of traffic congestion on the existing facility seriously inhibit its ability to function as a vital transportation link.

- Growth in the area has been extremely high and is expected to continue into the foreseeable future. The existing facility is inadequate to handle the growth of the area that has already occurred and improvements are necessary to accommodate anticipated future growth.

- US 93 carries nearly twice the average daily traffic of any other rural 2-lane facility in Montana. The existing highway capacity is inadequate to safely and efficiently handle existing and projected traffic. This has resulted in a high degree of traffic congestion and increased impacts to noise and air quality within the corridor. Significant reduction of traffic and/or improvement to capacity are needed to bring the level of service to recommended standards.

- Traffic congestion and restrictive geometry of the existing highway contribute to accident potential. Crossing deer are also a major source of accidents and property damage. High access density and major roadway junctions at unsignalized intersections are also contributing factors. There is a need to improve safety and reduce the number of accidents in the project corridor by improving transportation facilities.

- The condition and function of US 93 in the project corridor play an active role in meeting a number of social and economic needs. Protection and enhancement of transportation in the corridor is needed to provide compatibility with land use planning, facilitate or discourage access where appropriate, and to provide for economic stimulation by meeting stated goals in local economic development plans. There is a need to preserve community cohesion and character through controlling strip growth and keeping future growth within reasonable bounds. There is also a need to respond to significant public demands for transportation improvements by providing environmentally responsible alternatives with minimal impacts at the earliest possible date.

- The existing highway is old, has seen little improvement since initial construction, and was designed to inferior standards in comparison to those currently in use. Sharp curves steep grades, inadequate shoulders, narrow bridge widths, insufficient and deteriorating pavement structures, steep sideslopes, inadequate clear zones, and lack of mailbox turnouts and turning lanes all represent deficiencies in the existing facility that need correction.

- Important links with major intermodal transportation facilities are provided by the existing highway. There is a need to protect and enhance the facility's ability to continue providing significant intermodal connection.

MAJOR ACTIONS PROPOSED BY OTHER AGENCIES

Other major actions have been proposed by governmental agencies in the same general geographic area. These actions include:

- Improvements to portions of US Highway 93 in Ravalli County, Montana, further south of the Hamilton to Lolo segment, have also been proposed. The proposed improvements consist of the reconstruction and realignment of the highway in the Conner and Sula areas. The impacts of these projects have been documented in Environmental Assessments on file with the Montana Department of Transportation (MDT).

- Reconstruction of State Route 269 near the Town of Corvallis, Montana, in Ravalli County has also been proposed. This highway is locally known as the Eastside Highway and connects the communities of Hamilton, Corvallis, and Stevensville before feeding into US 93 within the study corridor. The project will reconstruct 11.9 km (7.38 miles) of the highway and is known as the Corvallis North and South project, STPS 269-1(11)5. The environmental impacts associated with this project have been documented and are on file at MDT.

- The Ravalli County Planning Office is currently in the process of drafting a land use plan for the Bitterroot Valley. Any proposed improvements to the transportation corridor considered by the Hamilton to Lolo EIS will need to support the new land use plan. Coordination will need to continue between the development of the Hamilton/Lolo project and the Ravalli County Planning Office.

- A Draft Environmental Impact Statement has been issued for the Evaro to Polson portion of US 93 north of Missoula. Proposed improvements consist of adding additional lanes to improve capacity and safety.

ALTERNATIVES

"No Action", "No Build", and "Build" Alternatives were all considered for this project. Through extensive efforts in public involvement and scoping, the alternatives were narrowed down to those most feasible:

- <u>"No Build" Alternatives</u>

    - "no action"
    - commuter bus service
    - passenger rail service
    - park-and-ride system (car and van-pooling)

- <u>"Build" Alternatives</u>

    - modified 2-lane highway
    - 4-lane undivided highway
    - 4-lane divided highway with a 12.5 m (40-foot) median
    - 5-lane highway with a center turning lane

- <u>Realignment Alternatives</u>

    - Silver Bridge crossing of Bitterroot River
    - Bass Creek Hill realignment

Each alternative is discussed and evaluated in detail in the text of this document. The alternatives were developed and considered for evaluation through consultation and coordination between the Federal Highways Administration (FHWA), the Montana Department of Transportation (MDT), the general public through extensive public involvement, environmental groups, a citizen's advisory committee, an interdisciplinary team, and concerned government and regulatory agencies.

Alternatives which generated little support or failed to reasonably address the stated purposes and needs of the proposed action were eliminated from further study. Examples from among the three categories presented above include:

- Controlled access (replaced by access control in conjunction with preferred "build" alternatives)

- 3-lane highway (not supported by the public)

- Sapphire Freeway ("Interstate" type highway type facility along east side of Valley)

- Urban bypasses of Victor, Florence, and Hamilton (not supported by the public!)

PREFERRED ALTERNATIVE

After consideration of extensive public input and numerous technical reports prepared to facilitate compilation of this document (Appendix B), the citizen's Advisory Committee and Interdisciplinary Team have reached a general consensus on recommending a preferred alternative for improving transportation in the study corridor.

Conceptually stated, the preferred alternative is a combination of "no build" and "build" activities that are least environmentally damaging yet capable of meeting the required purposes and needs:

- Construction of park-and-ride lots in or near the major population centers of the corridor (Hamilton, Woodside, Victor, Stevensville, Florence, and Lolo) to facilitate and encourage car pooling and use of public transportation.
- Establishment of a transportation management association (TMA) to provide public education, promote local efforts, and encourage methods to reduce traffic on the highway.
- Utilization of access control in conjunction with "build" alternatives to encourage densification in existing development areas and discourage growth elsewhere.
- Reconstruction of the highway by use of the 4-lane undivided section in rural areas and the 5-lane section (4-lanes with a center turning lane) in developed areas.
- Realignment for a new crossing of the Bitterroot River at the Silver Bridge just north of Hamilton.
- Realignment at Bass Creek Hill to reduce potential adverse environmental impacts and improve grades.
- Construction of turning lanes, traffic signals, wide shoulders, and bicycle facilities to enhance traffic flow and safety, and provide for pedestrian/bicycle movement.
- Use of curb, gutter, and sidewalk in urban areas to improve drainage, better define accesses, and provide for pedestrian and bicycle movement.

Graphical depiction of the "build" portion of the preferred alternative on an aerial photo background can be found in Appendix A. The information shown is similar to what would occur for the other "build" alternatives considered. Recommendation of the preferred alternative was based on meeting the purpose and need, public support, regulatory agency support, minimization of environmental impacts, and economic feasibility.

MAJOR ENVIRONMENTAL IMPACTS

The proposed action will result in both beneficial and potentially adverse environmental impacts. Environmental impacts considered to be adverse will require mitigation as discussed later in this document. The major environmental impacts identified by this document include:

- Likely Beneficial
    - improving transportation safety, efficiency, capacity, and level of service within the corridor
    - reducing traffic congestion
    - reducing air pollution through improved traffic flow
    - upgrading deficient structures and roadway segments
    - providing route continuity and system linkage

- accommodating present and projected growth
- enhancing economic development opportunities
- coordinating with land use planning through access control to encourage densification of developed areas and preservation of undeveloped areas, including discouraging strip development
- encouraging transportation demand management (ways to reduce traffic on the highways) through establishment of a local TMA, encouraging car and van pooling, and facilitating pedestrian and bicycle usage within the corridor
- preserving community cohesion and character through maintaining the existing alignment
- responding to public demand for transportation improvements

• Potentially Adverse

- impacting approximately 19.0 hectares (46.9 acres) of existing wetlands which includes some habitat areas
- committing land for additional right-of-way, including approximately 0.4 hectares (0.9 acres) of prime or state-wide important farmland
- encroaching on approximately 21.6 hectares (53.3 acres) of floodplains
- creating the potential for short-term turbidity and sediment increases in surface water
- creating possible barriers to fish and wildlife movement
- continuing the present problem of high deer kills and damage from collisions
- risking poor embankment foundations and unstable cut slopes in areas with fine-grained soils and high groundwater tables
- committing material and financial resources for implementation of the preferred alternative

Many other potential environmental impacts were thoroughly studied and documented as set forth in this report. However, the impacts identified were not considered to be "major" and thus were not repeated here. This document also recommends proposed mitigation to minimize the impacts considered to be potentially adverse or to enhance beneficial impacts where possible.

AREAS OF CONTROVERSY

The proposed action has generated much discussion, thus raising several issues of concern. Extensive efforts at public involvement through the scoping process helped to clearly identify significant project issues and prioritize them for study and resolution. These issues have been carefully investigated by experts in their respective fields, by governmental agencies, and by discussion with the public in the scoping meetings. Fortunately, most issues have been resolved through this process; however the following areas of controversy still remain:

- There is still considerable discussion among area residents concerning "growth" versus "no growth" issues. Many desire to accommodate the rapid growth currently being experienced and provide for further economic development, while others desire to protect the attractiveness of the area and maintain the present "quality of life" by discouraging growth.

- The efforts just now beginning for establishing land use planning in the corridor will require compatibility of any recommended improvements with future land development patterns and goals, even though such planning is currently in the draft stage of development.

- Many are frustrated with delays in implementation and funding of needed transportation improvements. Construction of any recommended improvements may be several years in the future.

MAJOR UNRESOLVED ISSUES

Almost all of the issues of concern have been resolved. However, the following issues are still being evaluated:

- Conclusions and recommendations for proposed actions set forth in this document require approval.
- Detailed wetland mitigation plans and locations will need to be developed and approved.
- Permits from Federal, State, and local agencies must still be acquired prior to constructing recommended improvements.

OTHER FEDERAL ACTIONS REQUIRED

Other Federal actions required before implementation of the proposed improvements include:

- The US Army Corps of Engineers must issue the Section 404 Permit before construction of any of the "build" alternatives, specifically concerning fill in wetlands and/or stream areas.
- The Federal Emergency Management Agency (FEMA) must approve the floodplain encroachments.
- Federal funds must be secured in combination with State funds in order to provide the required capital for construction and implementation.

ABBREVIATIONS

Following is a list of abbreviations that may be found within the text of this document:

AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ADT	Average Daily Traffic
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second
CO	Carbon Monoxide
COE	US Army Corp of Engineers
CWA	Clean Water Act
D	Degree of Curvature
dB	Decibels
dBA	A-wieghted decibels
DHV	Design-Hourly Volume
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FhWA	US Department of Transportation, Federal Highway Administration
FEIS	Final Environmental Impact Statement
FIRM	Flood Insurance Rate Map
FPPA	Farmland Policy Protection Act of 1981

GPS	Global Positioning Satellite
ID Team	Interdisciplinary Team
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
km	Kilometers
klpd	Kiloliters Per Day
km/h	Kilometers Per Hour
L_{eq}	Equivalent sound level, or average noise level
$L_{eq(h)}$	Design hourly volume equivalent sound level
lpd	liters per day
lpm	liters per minute
LOS	Level of Service
MAAQS	Montana Ambient Air Quality Standards
MAQD	Montana Air Quality Division
MAQS	Montana Air Quality Standards
m	Meters
MCA	Montana Code Annotated
MDEQ	Montana Department of Environmental Quality
MDEQ-WQD	Montana Department of Environmental Quality - Water Quality Division
MDFWP	Montana Department of Fish, Wildlife and Parks
MDNRC	Montana Department of Natural Resources and Conservation
MDT	Montana Department of Transportation
MOA	Memorandum of Agreement
mph	Miles Per Hour
MRL	Montana Raillink Railroad
MT	Montana
NAAQS	National Ambient Air Quality Standards
NAFTA	North American Free Trade Agreement
NEPA	National Environmental Policy Act of 1969, as amended
NFIP	National Flood Insurance Program
NHS	National Highway System
NRHP	National Register of Historic Places
pcph	Passenger Cars per Hour
PM_{10}	Respirable Particulates
PTW	Present Traveled Way (Existing Road)
R/W	Right-of-Way
RV	Recreational Vehicle
SCS	US Department of Agriculture, Soil Conservation Service
SHPO	State Historic Preservation Office
SO_2	Sulfur Dioxide
TDM	Transportation Demand Management
TMA	Transportation Management Association
TSM	Transportation System Management
US 93	US Highway 93
USC	United States Code
USDI	US Department of the Interior
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
VPH	Vehicles per hour measured as service flows with LOS

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CHAPTER 1.0

PURPOSE OF AND NEED FOR ACTION

PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

The purpose of this Chapter is to set forth background information for the project and review the purposes and needs that exist for investigating and recommending proposed actions to meet the needs. Much of the information presented here appears in summary form; more description of how the data was generated, what it really means, and how to interpret it is given in subsequent chapters. Later, alternatives are developed and evaluated with regard to meeting the purposes and needs enumerated herein.

1.2 PROJECT BACKGROUND

US Highway 93 is a principal arterial that traverses western Montana in a north-south direction (Figure 1-1). This highway extends from near Phoenix through Arizona, Nevada, Idaho, and Montana to the Canadian border. It is part of the National Highway System as a "highway of national significance" as established by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

The Montana Department of Transportation (MDT) is currently investigating ways to improve transportation in the corridor from Hamilton to Lolo, Montana, a 55.1 km (34.2 miles) segment of US 93 just south of Missoula (Figure 1-2). The milepost limits are from 49.0 at the northerly Hamilton City limits to 83.2 at the southerly Lolo City limits. The existing facility within this corridor is principally a 2-lane highway, briefly expanding to 4-lanes in the "urbanized" areas it passes through. These termini were selected because US 93 transitions from 2-lanes to 4 or 5 lanes beyond these limits for a considerable distance.

For convenience, the project corridor can be divided into roughly equal segments; Hamilton to Victor, Victor to Florence, and Florence to Lolo. US Highway 93 between Hamilton and Lolo was built under four separate highway projects:

Segment	Milepost	Length	Section	Year Constructed
Hamilton - Victor	49.0 to 59.0	16.1 km (10.0 mi)	49.0 - 49.7	1939
			49.7 - 59.0	1952
Victor - Florence	59.0 to 74.1	24.3 km (15.1 mi)	59.0 - 73.5	1956
			73.5 - 74.1	1975
Florence - Lolo	74.1 to 83.2	14.7 km (9.1 mi)	74.1 - 83.2	1975

As a result of the different dates of construction and standards in existence at the time, the existing cross-sections differ from segment to segment, and, in many locations, the highway design is substandard according to current standards established by the American Association of State Highway Transportation Officials (AASHTO)[1] and MDT[2]).

The project area is very scenic with extensive recreational and tourist opportunities. The area is rapidly growing (22.8% growth from 1990 to 1994, highest growth rate in Montana for the period[3])and the economy is expanding. In response to traffic congestion and capacity the problems created by these circumstances, the general public and various state and federal agencies have supported the investigation of improvements to transportation in this corridor. This Draft Environmental Impact Statement (DEIS) summarizes the results of over three years of intensive public involvement and transportation, technical, and environmental impact studies.

U.S. Highway 93
HAMILTON TO LOLO
ENVIRONMENTAL IMPACT STATEMENT

FIGURE 1-1
REGIONAL TRANSPORTATION NETWORK

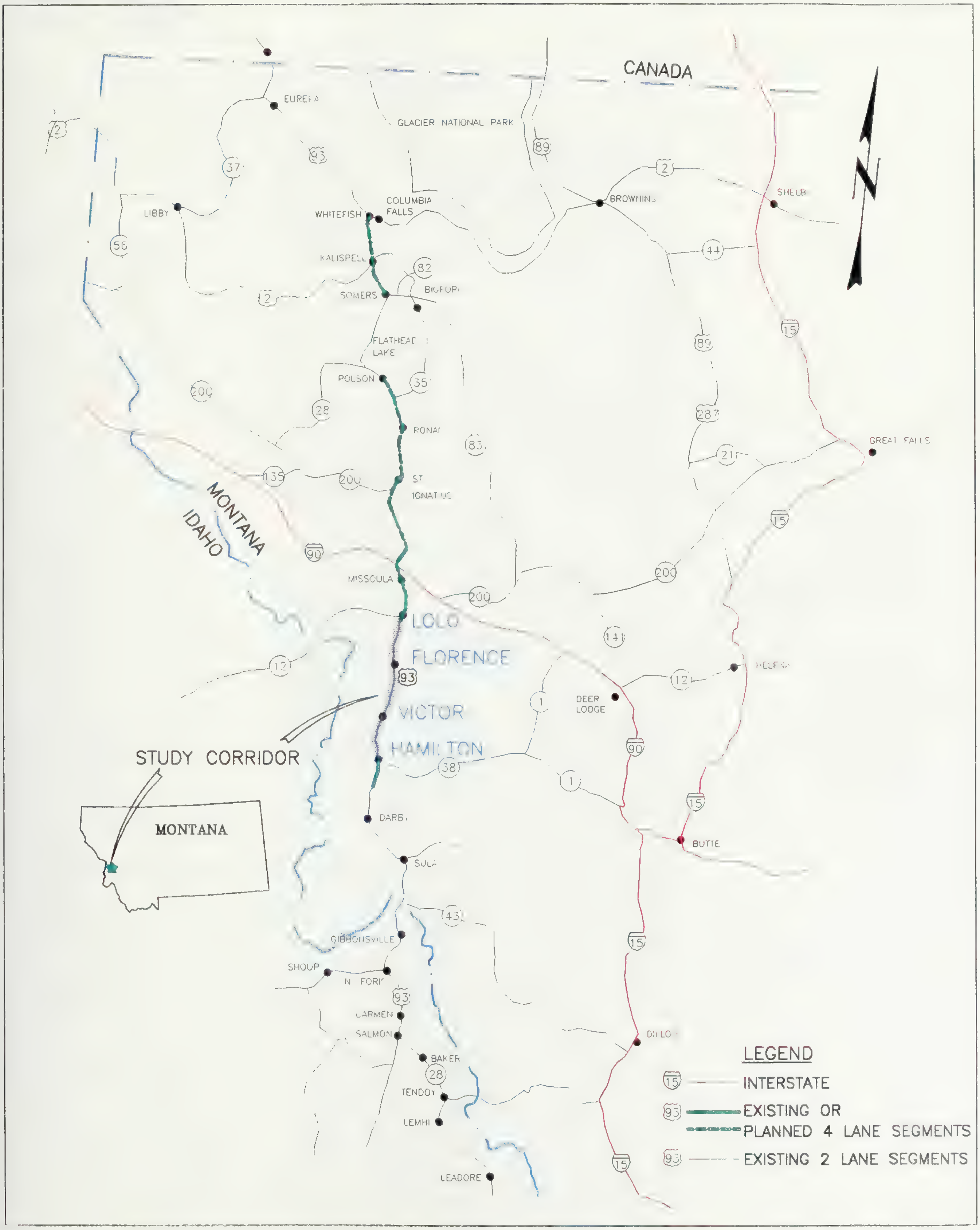
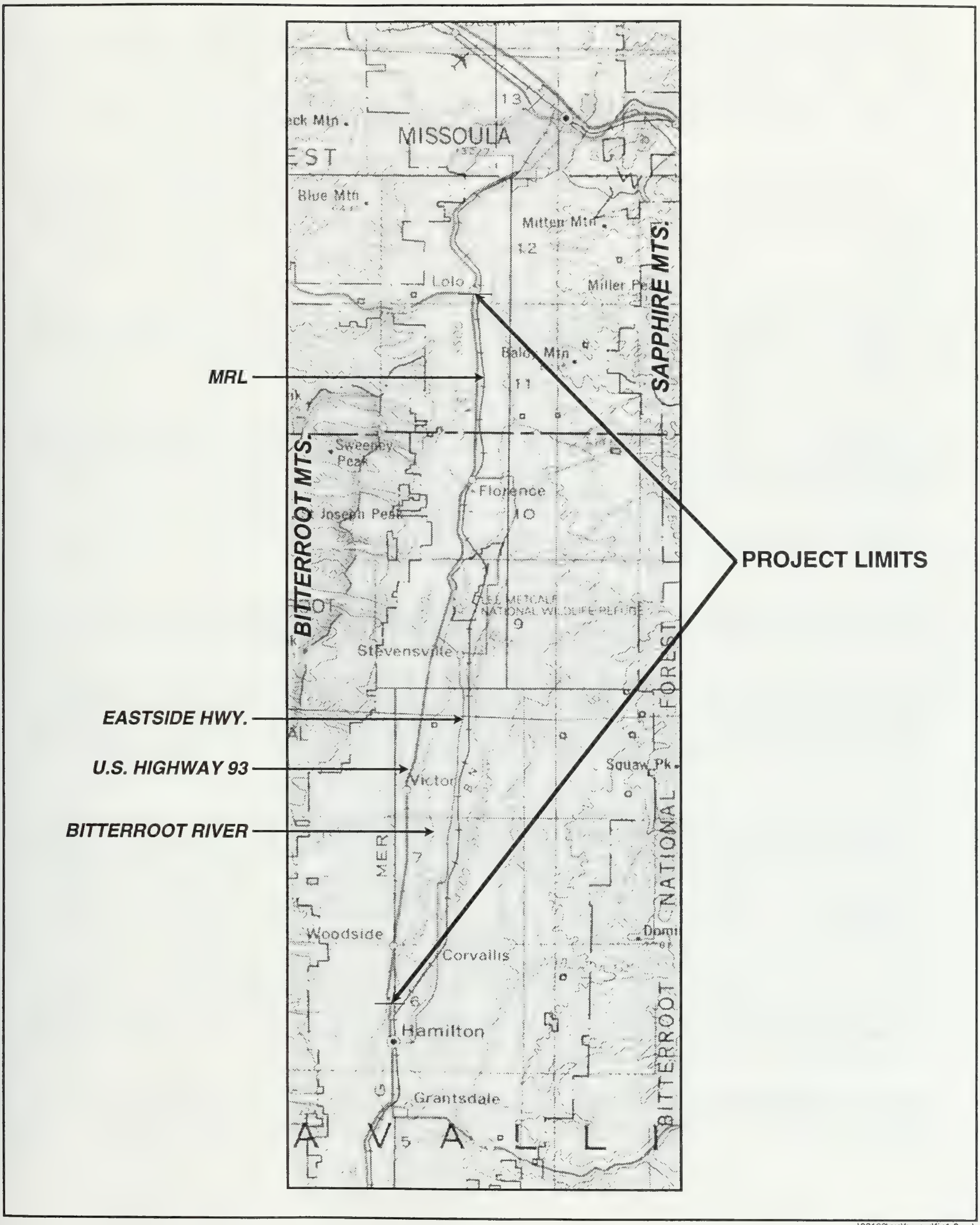


FIGURE 1-2
CORRIDOR STUDY AREA



The project is currently in the pre-design phase. Extensive efforts have been and are being made to include the public and various agencies in the decision making and planning processes.

Three sets of public scoping meetings have been held at different locations throughout the project corridor. The purpose of these public scoping meetings was to obtain public input on the project, to provide the public with access to the various environmental impact and design reports and the professionals who conducted them, and to present findings to date on different elements of the project planning process. They also served to confirm purposes and needs for improvements with the public as they were identified through the public involvement process.

In addition to the public scoping meetings, numerous meetings have been held with the Advisory Committee and Interdisciplinary Team assembled for the project. The purpose of these meetings was to obtain input and discuss alternatives with different experts, concerned governmental agencies, and citizens and organizations who have a "first hand" knowledge of the project needs.

Telephone and traffic surveys[4,5] were also taken in project corridor and general area in order to obtain additional input from the public. Reports concerning different areas of environmental impact have been written by consultants with expertise in each individual area (Appendix B). The conclusions and pertinent contents of these reports have been summarized and compiled into this DEIS. The actual reports are on file with MDT and are located in the public information depositories described herein.

All of these efforts have produced strong insights into the purposes and needs for improving transportation in the corridor. The following sections of this chapter will summarize the important purposes of and need for action to improve transportation in the US 93 corridor from Hamilton to Lolo. More detailed information on each of these topics is given in subsequent chapters.

1.3 SYSTEM LINKAGE

The portion of US Highway 93 from Hamilton to Lolo is an important transportation link on a local, state, and national level. Improvements are needed to preserve and enhance the functions of this vital link.

Locally, it is the primary transportation link between the cities and towns of Hamilton, Woodside, Stevensville, Victor, Florence, and Lolo. US 93 is also used heavily for commuting between various cities in the Bitterroot Valley to Missoula, which is the primary employment center in this area. Agricultural, logging, and recreational traffic are all major contributors to transportation through and within the corridor depending on the season.

On a state-wide basis US Highway 93 is an important north-south transportation route in western Montana. Functionally it is classified as a principal arterial by AASHTO guidelines.[1] The highway links Ravalli and Missoula counties and connects the Bitterroot Valley with the rest of the State. Commercial and recreational/tourism traffic are major components of the overall US 93 system. The highway provides the major transportation link to Flathead Lake and Glacier National Park, which are important recreational/tourism resources.

US Highway 93 is also important on the national scale. This highway begins near Phoenix, extending north through Arizona, Nevada, Idaho, and Montana to the Canadian border. It has been included in the National Highway System as established by the ISTEA and as adopted by Congress late in 1995. Highways on this system have been singled out nationwide to be improved to the best standards: wider shoulders, fewer curves, enhanced safety features, and passing lanes where needed.

As will be discussed in sections that follow, the existing facility is a 2-lane roadway with narrow shoulders, deteriorating pavement conditions on an inadequate subgrade, restricted width bridges, reduced passing

opportunities, and a high degree of congestion resulting from inadequate capacity. These conditions greatly inhibit its ability to function as the primary arterial in the area and to serve as a vital connecting link to other regional transportation systems.

Regional Transportation Network: Other highways in the vicinity of US Highway 93 from Hamilton to Lolo (see Figure 1-1).

- US Highway 93 north and south of the project corridor
- US Highway 12 between Lolo, Montana and Lewiston, Idaho
- Montana State Highway 203 between Florence and Stevensville.
- Montana State Highway 269 between Stevensville and Hamilton.
- US Highway 95 (the next north-south link to the west of US Highway 93) located 175 miles to the west beyond wilderness area and mountainous terrain
- Interstate 90 (an east-west Interstate going through Missoula).
- Interstate 15 (a north-south Interstate, paralleling US 93 80 miles to the east).

Review of Figures 1-1 and 1-2 show that effectively all traffic within the corridor must at one time or another use US 93 to gain access to other areas and transportation systems, including the major metropolitan area of Missoula north of the project corridor.

Related Major Actions: Other major actions improving or otherwise affecting transportation in the region have recently been completed or are in the planning stages. The following is a brief review of these actions and their relationship to the proposed action:

- <u>Improvements to US 93 South of Hamilton</u> - This includes recent reconstruction over Lost Trail Pass (both Montana and Idaho sides), plans for reconstruction and realignment in the Conner and Sula areas, and recent improvements south of Darby and south of Hamilton. All of these have improved the ability of US 93 to function as a regional arterial and important interstate transportation link.

- <u>Improvements of State Route 269 Near Corvallis</u> - This local highway connects the communities of Hamilton, Corvallis, and Stevensville before joining back into US 93 within the study corridor. The proposed project will improve its function as a collector feeding the US 93 arterial.

- <u>Improvements to US 93 North of Lolo</u> - The segment from Lolo into Missoula was recently reconstructed as a 5-lane facility to provide additional capacity and handle the high demand placed on it by its linkage of the Bitterroot Valley with Missoula. The Reserve Street project was also recently completed, which included construction of a 5-lane connector on the west side of Missoula between US 93 at the south end of the city and Interstate 90 northwest of the metropolitan area.

  A draft EIS has also been issued for the Evaro to Polson portion of US 93 north of the Missoula Valley. The proposed action there consists of adding additional lanes to the existing 2-lane facility to improve capacity and safety.

- <u>Land Use Planning</u> - The Ravalli County Planning office is currently in the process of drafting a land use plan for the Bitterroot Valley, including the project corridor. The plan specifies and emphasizes the importance of US 93 as the primary arterial through the area and calls for measures to preserve its function through control of access and land use adjacent to the facility.

All of these actions improve the function of the regional transportation network and place added emphasis to the US 93 corridor from Hamilton to Lolo as being a vital link in this system.

Statement of Need: US 93 is a major arterial highway in the regional transportation network. Other major actions in the project area have added emphasis to its important role in the transportation system. Current

physical limitations and the high degree of traffic congestion on the existing facility seriously inhibit its ability to function as a vital transportation link.

1.4 AREA GROWTH

The project corridor encompasses most of the population in the fastest growing area of the State.[3] The population of the area has more than doubled since 1970. The growth rate for the period of 1990 to 1994 was 22.8%. Growth rates in the corridor in the past decade have consistently been 4% to 6% per year. Current projections are that this growth rate will continue between 3.5% to 5% annually for the next 20 years. This growth has occurred in spite of the inadequacy of present transportation systems to handle the demand (discussed hereafter) and the continued growth is projected to occur with or without the proposed action. This growth is principally resulting from high aesthetic appeal of the area, reasonable land costs, a healthy economy, and considerable employment opportunities in the major metropolitan area of Missoula north of the corridor.

The need for the proposed action is principally driven by the growth of the area that has already occurred and the inability of the existing highway facility to safely and efficiently accommodate the demands placed on it. As growth continues, these inadequacies will become more apparent and the need for transportation improvements will increase correspondingly.

Statement of Need: Growth in the area has been extremely high and is expected to continue into the foreseeable future. The existing facility is inadequate to handle the growth of the area that has already occurred and improvements are necessary to accommodate anticipated future growth.

1.5 CAPACITY AND LEVEL OF SERVICE

During the public involvement process, the public repeatedly aired concerns for the obvious -- US 93 through the project corridor already does not have enough capacity to meet present traffic demand and the situation will only deteriorate as growth of the area continues into the future. The traffic survey indicated a portion of this problem is the vast dependency (80%) on single occupant vehicles, primarily associated with commuting between the Bitterroot Valley and Missoula.

US Highway 93 is predominantly a 2-lane facility throughout the length of the project corridor. In small areas of "urban concentration" or where major traffic feeders come into US 93 (i.e. Woodside, Victor, Stevensville Y Intersection, and Florence) the highway has been expanded to 4-lanes or 5-lanes to help facilitate access, improve safety for turning movements, and try to relieve congestion. Elsewhere in the project corridor the highway has turning lanes at major intersection County roads.

The problem is simply that the capacity of the road is inadequate to safely accommodate the high traffic demand placed on it from existing area growth. The highway becomes significantly congested during the day, particularly during the early morning and late afternoon hours associated with business commuting. During these times, long queues of traffic develop, reducing operational speeds on the facility and nearly eliminating opportunities for free traffic movements (i.e. passing). Vehicles desiring to turn have little opportunity to do so and further exasperate the congestion problem.

A Transportation Demand Management Study[6] showed that even in a best case situation of reducing traffic on the highway through feasible TDM techniques (about 5%), there still would not be enough capacity to meet the remaining demand. The following subsections highlight the need for improved capacity and level of service within the corridor.

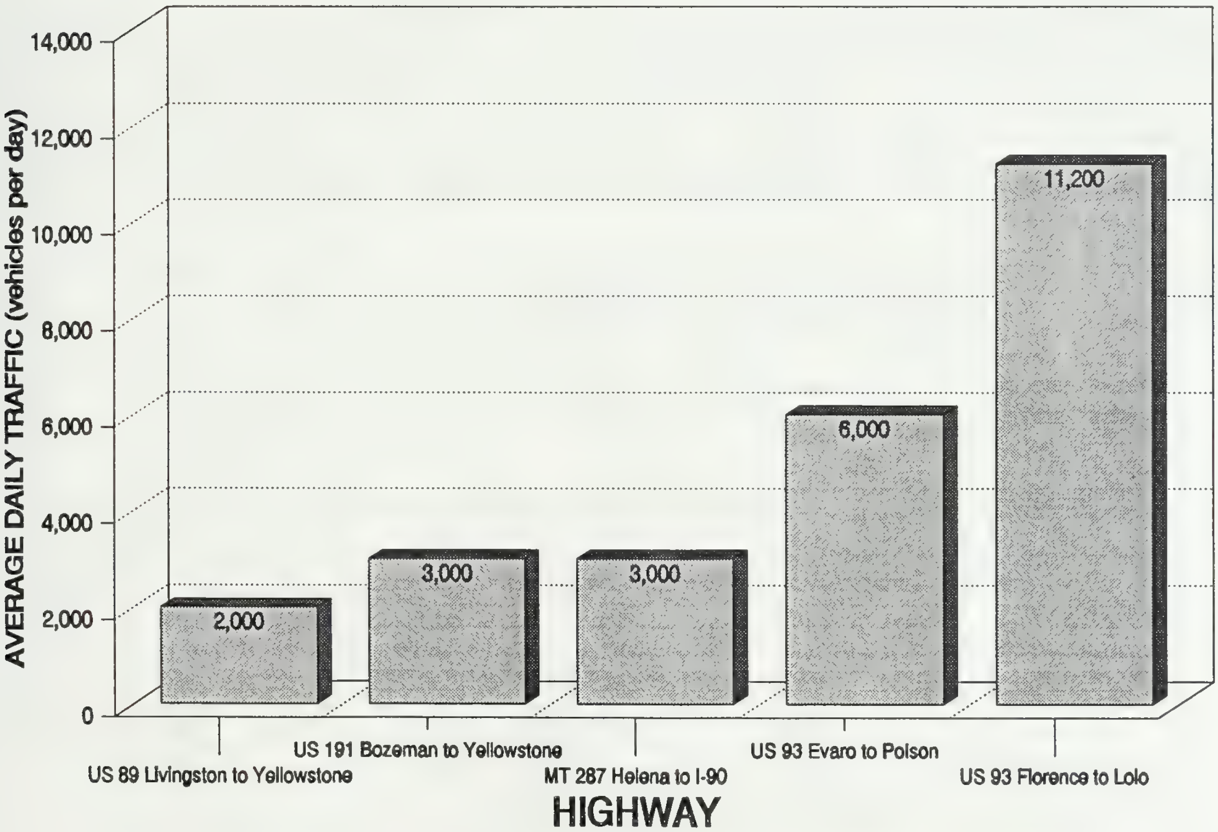
Historic Traffic Growth: As a result of the recent population growth of the Bitterroot Valley, traffic on US Highway 93 has also grown. The following table, taken from a traffic study of the corridor,[7] shows annual traffic increases experienced per year at various locations throughout the project corridor in the past 5-10 years. Note this phenomenal growth rate has occurred in spite of the inadequacies of the area's transportation systems, including US 93.

TABLE 1-1
RECENT TRAFFIC INCREASES ON US 93

Location	Traffic Increase (% per year)
Hamilton	7
Woodside	9
Victor	5
Stevensville	4
Florence	4
Missoula	4

Present Traffic Demand: US 93 within the project corridor carries more traffic on its 2-lanes than any other rural 2-lane facility in the State of Montana. Figure 1-3 compares the five most traveled rural 2-lane highways in Montana and clearly shows traffic demand in this segment to be far beyond any other:

FIGURE 1-3
TRAFFIC ON 2-LANE RURAL HIGHWAYS IN MONTANA



This is supported by information received in the Traffic Survey, wherein nearly half of the drivers indicated they had at one time or another changed their plan for time of travel on this stretch of US 93 for a reason other than weather. When asked why, 98% of those who had changed time of travel indicated it was due to "too much traffic" or to "avoid rush hour".

Projected Traffic Growth: The traffic is projected to continue to grow at just under 3% annually for the next 20 years. A significant conclusion of the traffic study[7] is that the Bitterroot Valley population growth is primarily affected by many more important factors than transportation availability. These factors include area economy, rural lifestyle ("quality of life"), reasonable cost of living, scenery, and recreational opportunities. US 93 is the only primary route through the Bitterroot Valley and the link to outside areas such as Missoula. This means that the traffic must use this highway at some point whether it is congested or not. Table 1-2 summarizes existing and forecast average daily traffic volumes (ADT) for key segments of the project corridor:

TABLE 1-2
EXISTING AND FORECAST TRAFFIC VOLUMES FOR US 93

Segment	Existing ADT	Forecast ADT
North of Hamilton	9,820	14,330
Woodside	9,130	14,850
Victor	6,160	9,630
Stevensville "Y"	6,620	9,710
Florence	7,370	11,260
Lolo	11,240	17,180
Missoula Limits (beyond corridor)	21,170	32,360

Present Capacity: National Standards[8] recommend the practical capacity for a rural 2-lane highway such as US 93 through the corridor is 1200 passenger cars per hour (pcph) total in both directions. The practical capacity for a 4-lane highway is 6600 pcph. The existing capacity of the highway during peak usage (rush hour) is already exceeded throughout much of the corridor and will totally be exceeded in the design year (20 years in the future) without some type of capacity improvement. Table 1-3 compares the present and forecasted capacity for US 93 for a 2-lane condition during peak usage and also shows the improvement in capacity that can be obtained by adding additional lanes to the existing facility.

TABLE 1-3
PRESENT AND FORECAST CAPACITY FOR US 93 (2-LANE)

Segment	Present Volume (pcph)	% of Recommended Capacity	Forecast Volume (pcph)	% of Recommended Capacity	
				2-Lane	4-Lane
North of Hamilton	1,470	123%	2,150	179%	33%
Woodside	1,370	114%	2,230	186%	34%
Victor	920	77%	1,450	121%	22%
Stevensville "Y"	990	83%	1,460	122%	22%
Florence	1,110	92%	1,690	141%	26%
Lolo	1,690	141%	2,580	215%	39%
Missoula Limits	3,180	48% *	4,850	---	73%

* Note: 4-lanes at this location, capacity = 6600 pcph

Existing Level of Service: Level of service (LOS) is a comparison of how well the available capacity of a highway matches with the demand placed on it. This performance is graded in levels A through F, much as a student's performance in school. Figure 1-4 describes the level of service for grades A through F and shows pictures of a stretch of highway under corresponding conditions.

Figure 1-5 shows the existing LOS and the projected change in LOS over time for the existing highway facilities for each of the three principal highway segments in the corridor if no improvement action is taken. A description of each LOS is provided on the right hand side of the graph, which matches the pictorial depictions shown in Figure 1-4.

The figures show the existing highway is currently, or will be, at the following levels of service during peak hours if no improvements to add capacity or reduce demand are undertaken:

TABLE 1-4
US 93 LEVEL OF SERVICE BY SEGMENT

Segment	Existing LOS	Future LOS
North of Hamilton*	E	E
Woodside	D	E
Victor	C	E
Stevensville "Y" *	D	E
Florence	D	E
Lolo*	E	F

*Shown in Figure 1-5

Portions of the existing highway will reach LOS E (maximum capacity) in the near future. US Highway 93 south of the intersection with US 12 in Lolo is currently operating at a LOS E during peak use. Twenty years into the future, all areas will be at absolute maximum capacity or "failing".

Similar level of service conditions exist at major intersections in the corridor. All intersections are currently unsignalized. Table 1-5 shows the existing and future levels of service for the side streets coming into US 93 at the listed locations:

TABLE 1-5
LEVEL OF SERVICE AT MAJOR INTERSECTIONS

Location	Milepost	Existing		Future	
		Major (northbound, southbound)	Minor (westbound, eastbound)	Major (northbound, southbound)	Minor (westbound, eastbound)
Woodside Crossing	52.0	A, A	C, B	A, B	F, F
Victor 3rd Avenue	59.0	A, A	B, B	A, A	C, B
Bell Crossing	61.1	A, A	B, B	A, A	C, B
Stevensville "Y" (Eastside Hwy)	66.8	A, A	C, --	A, A	F, --
Bass Creek Road	70.4	A, A	--, B	A, A	--, C
Sweeney Creek	73.0	A, A	A, B	A, A	B, C
Eastside Highway (Florence)	74.8	A, A	B, C	B, A	F, F

FIGURE 1-4
DESCRIPTIONS OF LEVEL OF SERVICE

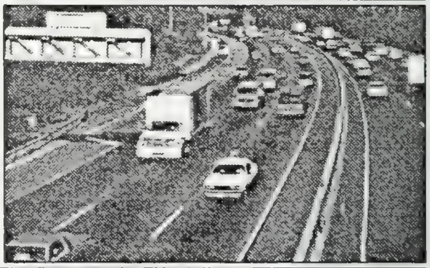
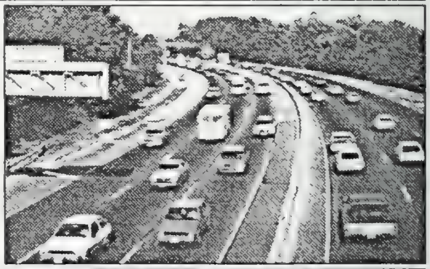
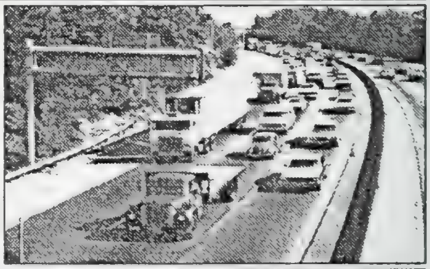
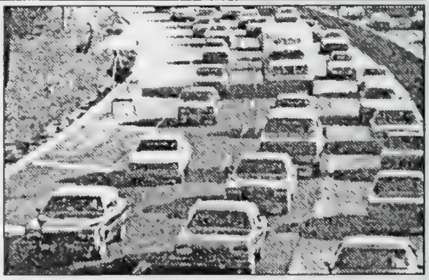
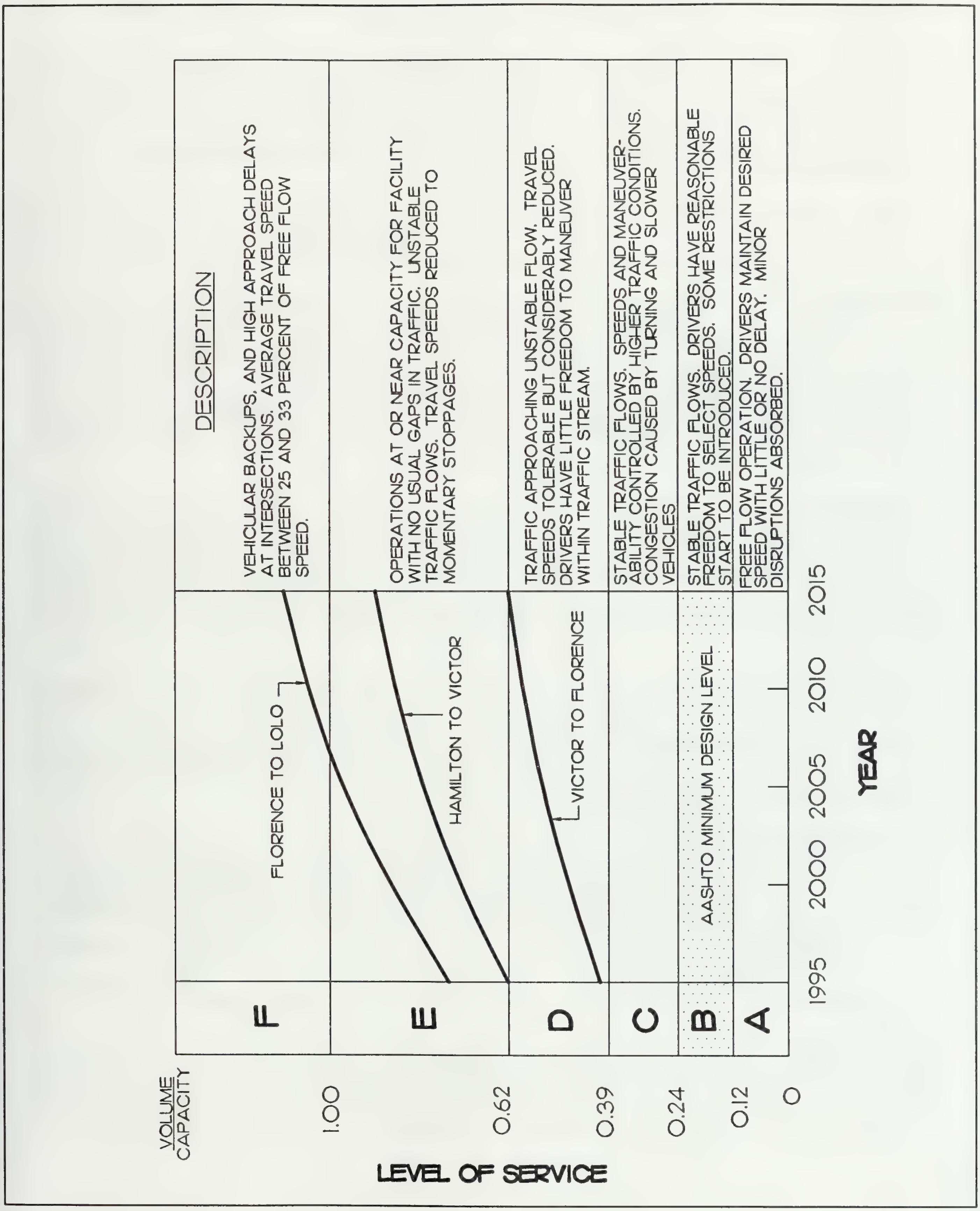
LEVEL OF SERVICE	DESCRIPTION	TYPICAL CONDITIONS
A	Free flow operation. Drivers maintain desired speed with little or no delay. Minor disruptions absorbed.	
B	Stable traffic flows. Drivers have reasonable freedom to select speeds. Some restrictions start to be introduced.	
C	Stable traffic flows. Speeds and maneuverability controlled by higher traffic conditions. Congestion caused by turning and slower vehicles.	
D	Traffic approaching unstable flows. Travel speeds tolerable but considerably reduced. Drivers have little freedom to maneuver within traffic stream.	
E	Operations at or near capacity for facility with no usual gaps in traffic. Unstable traffic flows. Travel speeds reduced to momentary stoppages.	
F	Vehicular backups, and high approach delays at intersections. Average travel speed between 25 and 33 percent of free flow speed.	

FIGURE 1-5
LEVEL OF SERVICE FOR EXISTING FACILITY



Desired Level of Service: According to current MDT design guidelines[2], a primary, rural arterial with terrain similar to this corridor should be designed for a 20-year life at LOS B. A high volume rural road, such as US 93, should be designed using design hour volume (DHV) values, which more accurately reflect peak usage instead of average daily traffic (ADT). For use in design, DHV should be 15% of the ADT.

It is obvious from Figure 1-5 that all segments of the existing highway are currently operating at substandard levels of service. For a LOS D, traffic approaches unstable flow and travel speeds are considerably reduced, therefore, drivers have little freedom to maneuver within the traffic stream. If existing conditions are perpetuated, the LOS would deteriorate to a LOS E, where the highway facility would operate at or near its capacity with no usual gaps in the traffic. The traffic flow would be unstable and traffic speeds would be reduced to momentary stoppages.

In order to improve the highway to its recommended LOS of B, substantial transportation improvements are necessary. One of the purposes for this project will be to provide for improved capacity and a greater level of service, both on the main highway and at major intersections.

Noise and Air Quality: Related concerns to the capacity issue are the environmental impacts associated with congestion. Air quality[9] and noise[10] studies both pointed out adverse impacts associated with the current and projected congestion being experienced in the corridor without improvements to the existing facility. Unstable traffic flows result in alternate slowing and acceleration of vehicles, sometimes as bad as stopping and starting vehicles altogether at points of high congestion. This greatly increases both the noise associated with normal traffic operations and also vehicle emissions; thus negatively impacting noise and air quality. There is a need to reduce the congestion problems from the noise and air quality perspectives as well as for increased capacity and improved level of service.

Transportation Demand: Extensive research[4,5] and study[6] was performed by experts in transportation demand management (TDM) to determine ways to improve the efficiency of the transportation corridor. TDM looks for ways to improve the capacity of the highway either by reducing traffic demand altogether, utilizing alternative modes of transportation, shifting traffic from peak to non-peak periods, or providing other similar measures. Doing so requires a knowledge of what type of traffic is on the highway and why. Figure 1-6 shows some observations about the traffic on the highway including type, purpose of trip, destination, and time of travel.

The TDM studies revealed that commuting is the major portion of the existing traffic and suggested something be done to reduce the existing dependency on the automobile as the main transportation source in the Bitterroot Valley. For example, the survey shows over 80% of the vehicles had only a single occupant and 63% of the traffic was using US Highway 93 for work or business purposes. With the obvious need to reduce traffic and discourage the use of single occupant vehicles, there is a need to examine TDM techniques in an effort to improve transportation in this corridor.

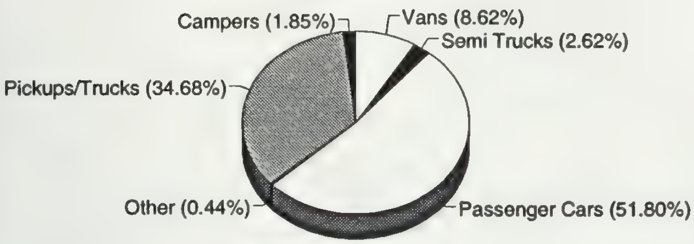
Statement of Need: US 93 carries nearly twice the average daily traffic of any other rural 2-lane facility in Montana. The existing highway capacity is inadequate to safely and efficiently handle existing and projected traffic. This has resulted in a high degree of traffic congestion and increased impacts to noise and air quality within the corridor. Significant reduction of traffic and/or improvement to capacity are needed to bring the level of service to recommended standards.

1.6 SAFETY

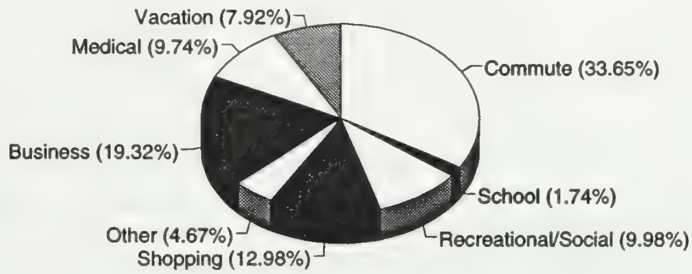
Accident statistics[7,11] have also been examined throughout the corridor. During the five year period from July 1987 to June 1992 there were approximately 570 accidents occurring in the corridor. A considerable number of these, as those who live in the corridor can testify, are involved with animal collisions. This and possible poor lighting conditions are the types of accidents in the corridor that exceed statewide averages.

FIGURE 1-6
TRAFFIC SURVEY OBSERVATIONS
(JULY 1992)

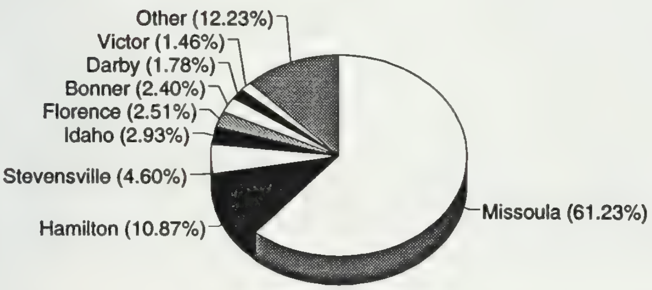
TYPE OF VEHICLE



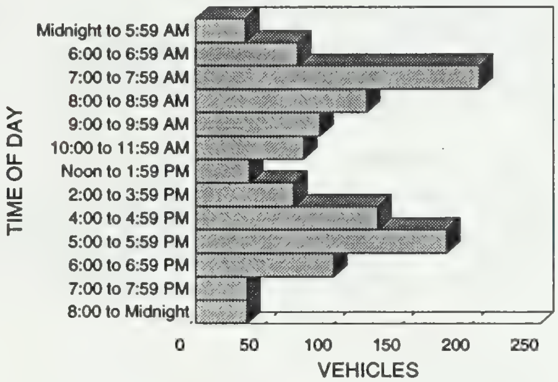
PURPOSE OF TRIP



TRIP DESTINATION



USUAL TIME OF DAY OF TRAVEL



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The following table summarizes the results of the study in comparison to statewide averages. Shaded areas are those that exceed the statewide average:

TABLE 1-6
ACCIDENTS IN STUDY CORRIDOR - 7/87 TO 6/92

Type of Accident	# Occurring	Local %	Statewide Average
Truck Accidents	40	7.0%	12.0%
Overturning Accidents	75	13.2%	21.0%
Animal Accidents	100	17.5%	10.8%
Icy/Snowy Conditions	108	18.9%	27.4%
Dark/Dusk Conditions	241	42.3%	35.8%
Other	6	1.1%	---
TOTAL	570	100%	---

Of the 570 accidents in the study area during the period of time examined, nine were fatal accidents resulting in 11 fatalities and 15 injuries. There were 229 injury accidents resulting in 345 injuries; 332 accidents resulted in property damage only. The study also identified 21 areas where accident clusters were identified, some of which already have recommendations for safety improvements, such as flashers, guardrails, turning lanes, lighting, etc.

Examination of the accident data starts to show the relationship of the existing facility to accidents. As expected, there are a number of accidents related to turning movements in areas where major traffic feeders come into US 93 or areas that show a higher degree of development (need for access and turning). 25.4% of the accidents in the corridor were angle collisions versus a 15.3% average statewide. The percentage of rear-end collision - 16.7% also exceeds the statewide average of 13.8%. Rear-end collisions are more common in areas subject to a high degree of congestion.

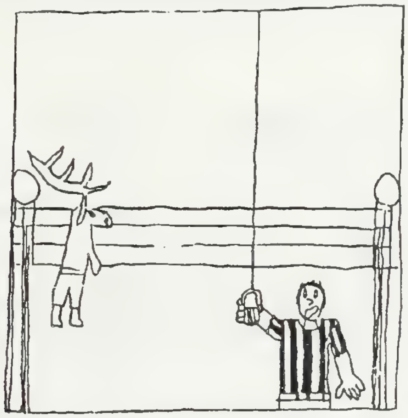
Plotting the accident history with respect to location reveals about double the number of accidents per mile in these developed areas compared to other locations in the corridor. The existing 2-lane facility lacks capacity (creates congestion) and also does not provide the opportunity for safer turning movements and access in these areas, both of which contribute to the higher rate of accidents in these areas.

In some areas the density of approaches to the highway is high. This includes street intersections, driveways from residences and businesses, farm field approaches, and others. In areas of strip development near major junctions an appreciable degree of cross traffic is generated by ingress and egress from these developments. Some approaches in the corridor have undesirable angles of intersection with the highway or grades that are too steep, both of which contribute to accident potential.

Animal Accidents: Locally the incidence of animal accidents is a major concern. This was borne out in public scoping meetings and the traffic and telephone surveys where the public clearly indicated that animal collisions were a major problem and concern in the corridor. One woman was overhead to say "I've never met a deer yet that I didn't hit!". Figure 1-7 depicts public sentiment about this common problem in a humorous way through the creativity of a young gradeschooler:

FIGURE 1-7
DRIVING IN MONTANA

DRIVING IN MONTANA



In this corner, a bull elk
In the other corner, a Chevy Blazer

Ted Koon - Grade 8 - Avon School

US 93 through the corridor is primarily a 2-lane facility with narrow shoulders and frequent steep sideslopes. Much of the land through which it passes is undeveloped being used either for pasture or natural wetlands and forested areas, particularly along water courses. These areas are frequented by whitetailed deer and provide deer with cover or otherwise restrict drivers' vision of deer until they emerge on the edge of the roadway attempting to cross. Either a narrow shoulder or the on-coming traffic lane are the only areas available to avoid collision.

As a result of the unexpected level of concern by the public on this issue, a special study[12] was commissioned on the deer kill problem. Conclusions of that study indicated that nearly 500 deer per year are killed in the Bitterroot Valley, causing estimated property damages in an excess of $700,000 annually. As expected, the majority of animal collisions occurred in the nighttime and early morning hours. The frequency of occurrence dramatically increased during the fall months. Interestingly, there were no "clusters" of wild animal accidents along the corridor, suggesting widespread crossings and no particular "game trails".

Driver Frustration: Another safety concern is related to driver frustration from congestion. Approximately 20% of the corridor contains "no passing" areas and the heavy traffic congestion creates long lines of cars behind slow moving vehicles (i.e. RV's, trucks, buses, and overly cautious drivers). This is known to create a level of frustration in the general motoring public to the point where hurried, unsafe attempts to pass are frequently made. The resulting lane changing and speed differential between vehicles contributes to a number of accidents.

Similarly, long queues are created at major intersections during peak commute times where the mainline traffic on US 93 offers no safe gaps for entering the traffic stream from connecting roads or major accesses. Again, unsafe maneuvers are made in an attempt to merge that are likely to produce accidents, particularly in areas without acceleration or merging lanes.

All of the above conditions related to safety and accidents were thoroughly confirmed by public input during the scoping process. Any proposed transportation improvements should address these issues by trying to reduce the number of accidents resulting from the highway deficiencies, wildlife crossings, and driver frustration.

Statement of Need: Traffic congestion and restrictive geometry of the existing highway contribute to accident potential. Crossing deer are also a major source of accidents and property damage. High access density and major roadway junctions at unsignalized intersections are also contributing factors. There is a need to improve safety and reduce the number of accidents in the project corridor by improving transportation facilities.

1.7 SOCIAL AND ECONOMIC NEEDS

Various social and economic needs were identified from area economic reports, public input, and agency input. In particular, these sources suggest any improvements to the transportation corridor should support and compliment future plans for social and economic growth in the Bitterroot Valley while preserving "community character" and cohesion. The alternatives' impact on land use, the environment, the Valley's economy, and "quality of life" must be carefully identified and evaluated.

Land Use: Ravalli County is currently drafting a land use plan and policy[13]. This plan is needed to help guide the current unplanned land development patterns. Missoula County has similar regulations already in place. Both documents call for protecting and enhancing the function of US 93 as the major transportation arterial through the area.

Along several sections of US Highway 93 in the study corridor, "strip growth" development has already occurred due to the current permissive access control policies and lack of land use planning. The resulting congestion and high degree of access diminish the capacity of US 93 to function as a transportation arterial. Socially, many have expressed fears that further uncontrolled "strip growth" may overrun individual communities; resulting in a loss of community character, cohesion, and identity.

Any proposed improvements to US Highway 93 should include access control policies that will preserve the function of US 93 as an arterial and compliment local land use plans and Ravalli County's future land use plan. The Missoula County segment of the corridor is already zoned, which planning should also be protected by complimentary transportation planning and access policies.

Future Growth: Another important social concern brought out in the public scoping process input and studies was a discussion of the potential effects of any transportation improvements in the corridor on population growth in the Bitterroot Valley. Currently, Ravalli County is growing at a rate of nearly 6% per year,[3] which is the fastest growth rate in the State of Montana. The rate is expected to continue at 4% per year into the foreseeable future.[13,14] This rapid population growth has created present transportation problems and raised concern regarding the possible loss of rural lifestyle and the pristine nature of the Bitterroot Valley. A frequently voiced concern in public meetings has been that transportation improvements may further encourage growth and create even more problems ("If you build it, they will come!").

The conclusions of traffic study[7] and land use[14] reports suggest that the population is already growing at a maximum rate even with the existing inefficient and congested transportation facilities. The growth is resulting from a robust local economy, aesthetic appeal, and other market forces rather than from transportation availability or ease of access.

Although more discussion on these concerns is presented later in this document, it is clear that there is a need for accommodating the existing and projected growth of the project area while complimenting land use policies and protecting the Valley's quality of life and community character.

Environment: Other concerns voiced by the public during scoping meetings were in relation to possible environmental impacts associated with any transportation improvements. From the social aspect, any proposed transportation improvements should have the following objectives with respect to the environment:

- reduce or minimize deer crossing accident potential (previously discussed)
- reduce and minimize air pollution both in the Bitterroot Valley and Missoula areas
- compliment land use, control strip development, and preserve "quality of life" and "community character" (discussed above)
- reduce or control noise levels
- minimize environmental impacts on threatened, endangered, or species of concern, such as bald eagles, peregrine falcons, bull trout, and westslope cutthroat trout
- minimize water quality and floodplain impacts
- minimize impacts to wetlands
- protect cultural and historical sites and resources
- minimize unnecessary conversion of farmland to nonagricultural uses
- maintain the high visual quality of the Bitterroot Valley
- reduce dependence on fossil fuels
- encourage bicycle and pedestrian activities
- increase the transportation efficiency (will save energy and reduce pollution)
- enhance tourist and recreational opportunities and access

Most of the discussion later in this report documents and evaluates the extent of the impacts of the various alternatives on the environment. The bottom line is that whatever alternative(s) are selected, there is a definite need to provide for environmental compatibility and eliminate or minimize adverse impacts. Public acceptance of proposed solutions will be closely tied to the environmental compatibility and minimization of impacts associated with those solutions.

Economic Concerns: The economy of the Bitterroot Valley is currently expanding very rapidly in keeping with the population growth. Any proposed transportation improvements should be designed to accommodate increased economic growth and provide safe, efficient routes for commercial and industrial transportation, especially since US 93 is the primary truck route through this Valley. Recent passage of the North America Free Trade Agreement (NAFTA) will undoubtedly give further impetus to use of the highway for delivery of goods and services. The traffic survey[5] indicated over 63% of the traffic in the corridor was related to business or commuting, an additional 15% were in the process of shopping; overall eight of every ten vehicles is involved with some sort of economic activity.

Recreational and tourist traffic is also an important part of the local economy. Provision must be made for accommodating the needs of this sector of the traveling public and local governments have expressed the desire to have them "stop, stay, and spend" while traveling through the Bitterroot Valley.

Local Chambers of Commerce and other economic interests have or are now forming plans to stimulate economic development of the area. The Bitterroot Futures Study[14] has specifically analyzed the area economy and set forth action goals for protecting and enhancing the area economy in the future. One goal is to provide for sustainable development (meeting present needs without compromising future abilities to meet needs) by diversification of the agricultural and timber industries. Special emphasis has been directed toward soft industry (emphasizing cultural, tourism, entertainment, and recreation) and cottage industries (business activities that can be done in the home or outside large commercial or industrial centers).

Specifically the plan calls for promoting "expansion and improvements of Highway 93 between Lolo and Hamilton" and "enhancing the Highway 93 corridor" by making it more attractive for the recreational and tourism component of the economy. Contemplated transportation improvements must be supportive and consistent with these efforts to meet the local needs and goals of the business community.

Implementation of any proposed transportation improvements should be carefully analyzed and evaluated to ensure a cost effective solution. Both capital costs and long term operation and maintenance expenses need to be considered. Alternatives that are not economically feasible or justifiable should not be promoted as they represent a waste or inefficient use of financial and material resources. Similarly, alternatives requiring heavy investments in long-term operation and maintenance capability could also be detrimental to the local and state economies.

Public Demand: Strong public demand for improvements created the encouragement for state and local governments to pursue this study of potential transportation improvements. As earlier noted, congestion, air quality, safety concerns, and similar issues have created a noticeable public demand for improvements. This demand was consistently verified in the public involvement process, both in conjunction with the scoping meetings and also in the telephone and traffic surveys.

Many have expressed the need for a better highway to improve capacity, create increased passing opportunities, and improve the safety of the facility. Questions were asked of the public in the telephone and traffic surveys concerning the perceived problems and potential solutions for those problems within the study corridor. Figures 1-8 through 1-10 graphically depict this information in order of frequency of response as received from the public. Figure 1-10 is a comparison of the most frequently mentioned problems and solutions from both the telephone and traffic surveys.

Interestingly, Figure 1-10 also reveals an apparent discrepancy between what the public will tell a researcher on the phone and how they actually feel when traveling on the highway in their automobile. For example, many expressed support for mass transportation over the telephone, but not while traveling on the highway in the convenience of their own automobile. The idea that many feel public transportation is a good idea for someone other than themselves, was confirmed by many in the third set of public scoping meetings when this observation was publicly presented.

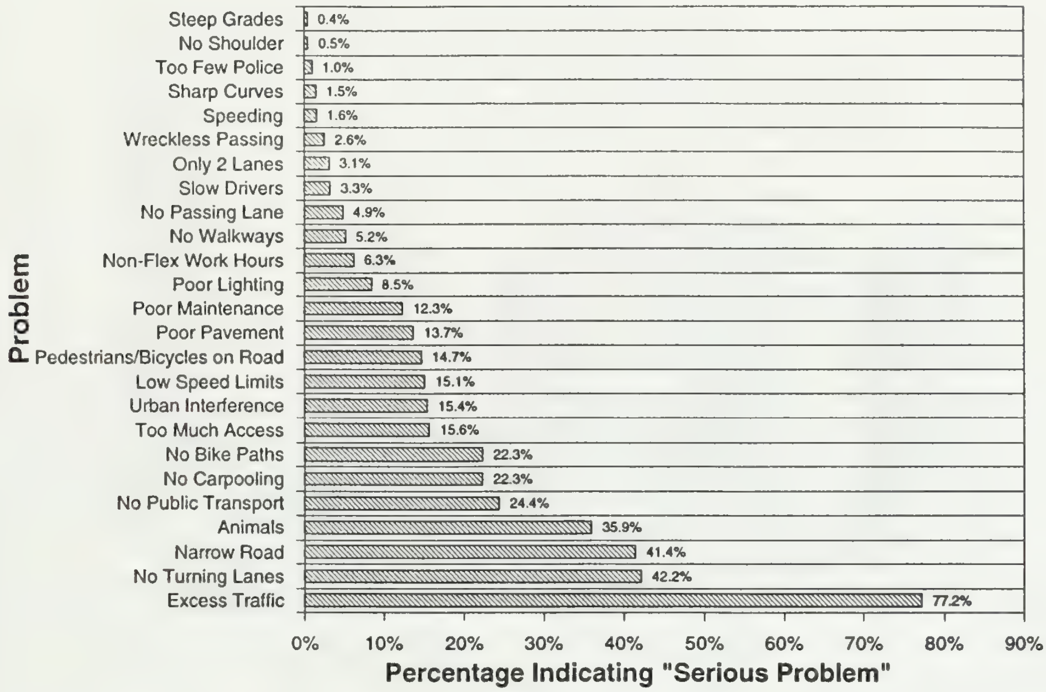
Obviously, there is a need for improved public education and awareness to help reduce the dependance on single-occupant vehicles and encourage more efficient transportation modes and techniques within the project corridor.

Lastly, the public frustration and corresponding demand for improvements is nowhere more clear than in the desire expressed in all public meetings about getting something accomplished quickly to improve transportation within the corridor. Many have expressed concern that the probable date of implementation of solutions is too far in the future to answer the existing need for improvements. There is also a sentiment that the problems have been studied to death and it is time now for action. The public has also demanded safer and more efficient accommodation of school bus traffic and improvement of emergency vehicle access. Clearly, these social concerns related to public demand play an important role in developing the plan for providing improvements in the project corridor.

Statement of Need: The condition and function of US 93 in the project corridor play an active role in meeting a number of social and economic needs. Protection and enhancement of transportation in the corridor is needed to provide compatibility with land use planning, facilitate or discourage access where appropriate, and to provide for economic stimulation by meeting stated goals in local economic development plans. There is a need to preserve community cohesion and character through controlling strip growth and keeping future growth within reasonable bounds. There is also a need to respond to significant public demands for transportation improvements by providing environmentally responsible alternatives with minimal impacts at the earliest possible date.

FIGURE 1-8
TRAFFIC SURVEY RATING OF
PROBLEMS AND SOLUTIONS

HAMILTON-LOLO TRAFFIC SURVEY RATING OF SELECTED PROBLEMS



HAMILTON-LOLO TRAFFIC SURVEY RATING OF SELECTED SOLUTIONS

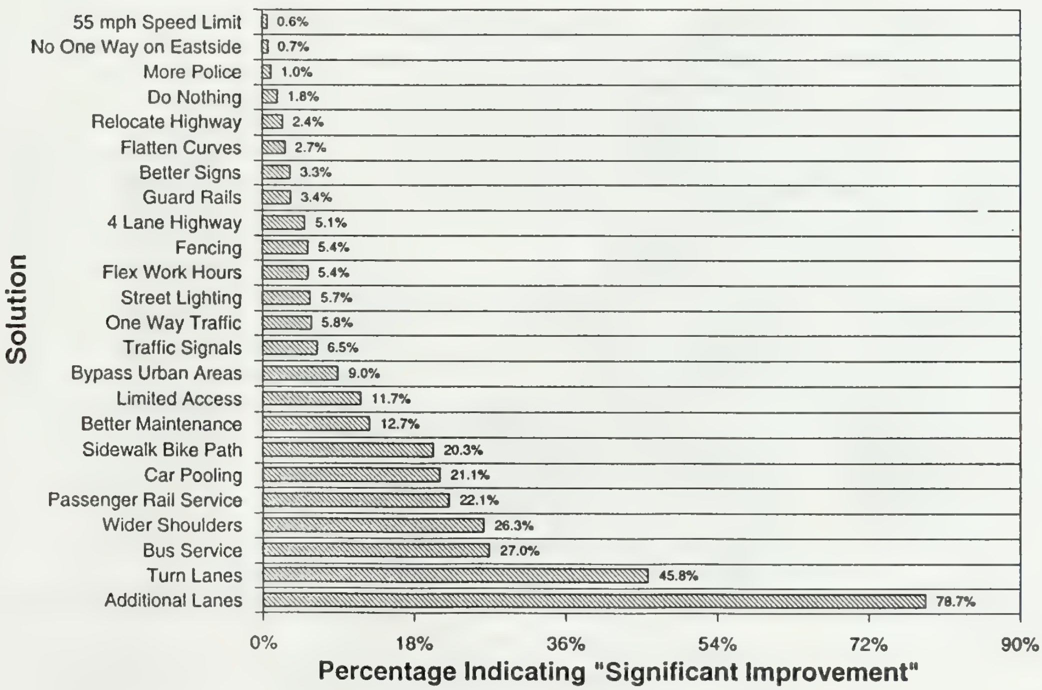


FIGURE 1-9
TELEPHONE SURVEY RATING OF
PROBLEMS AND SOLUTIONS

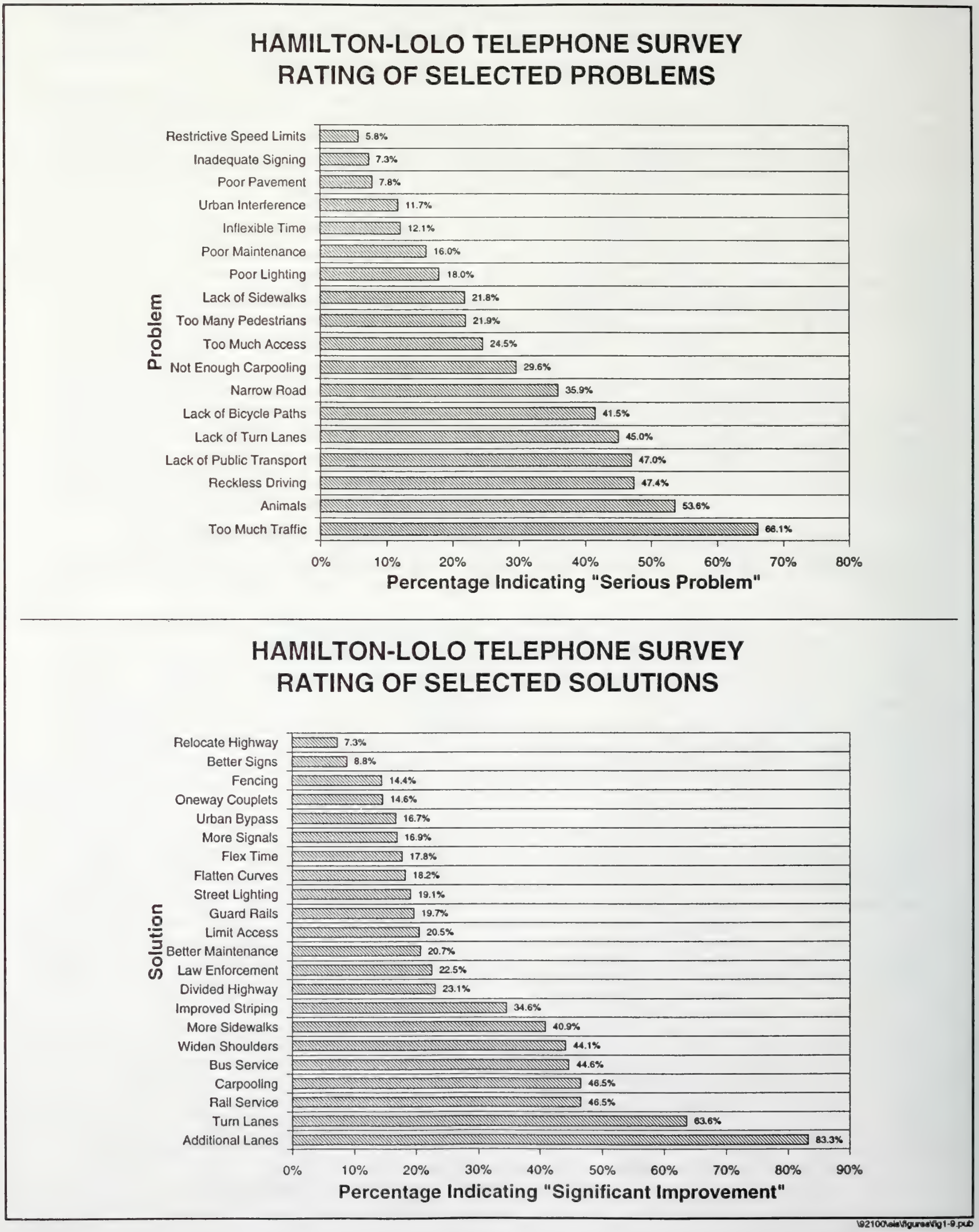


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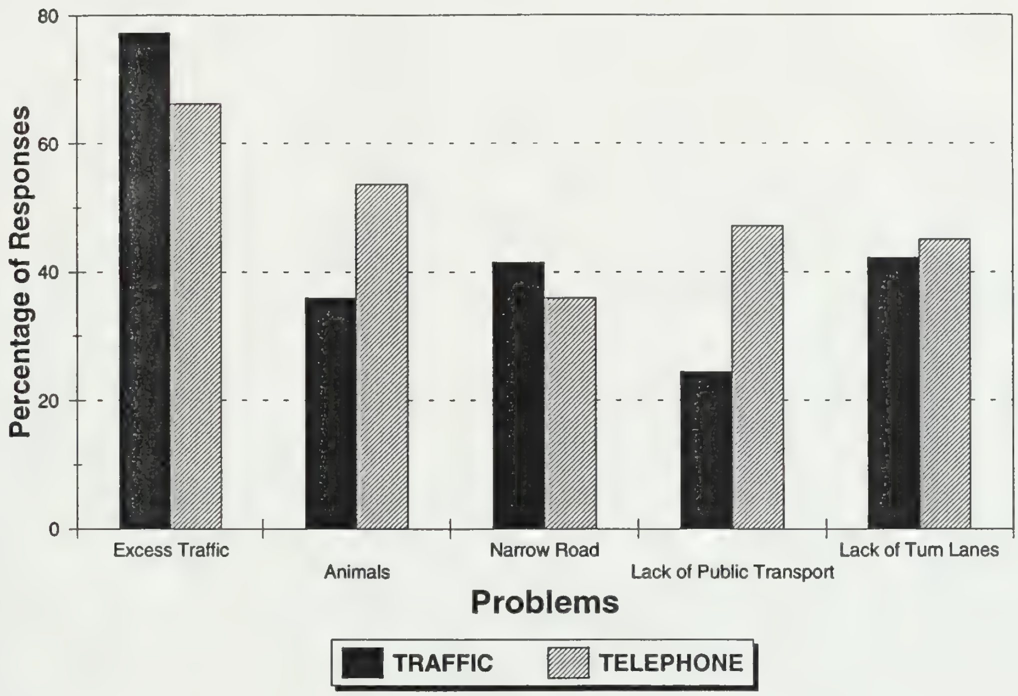
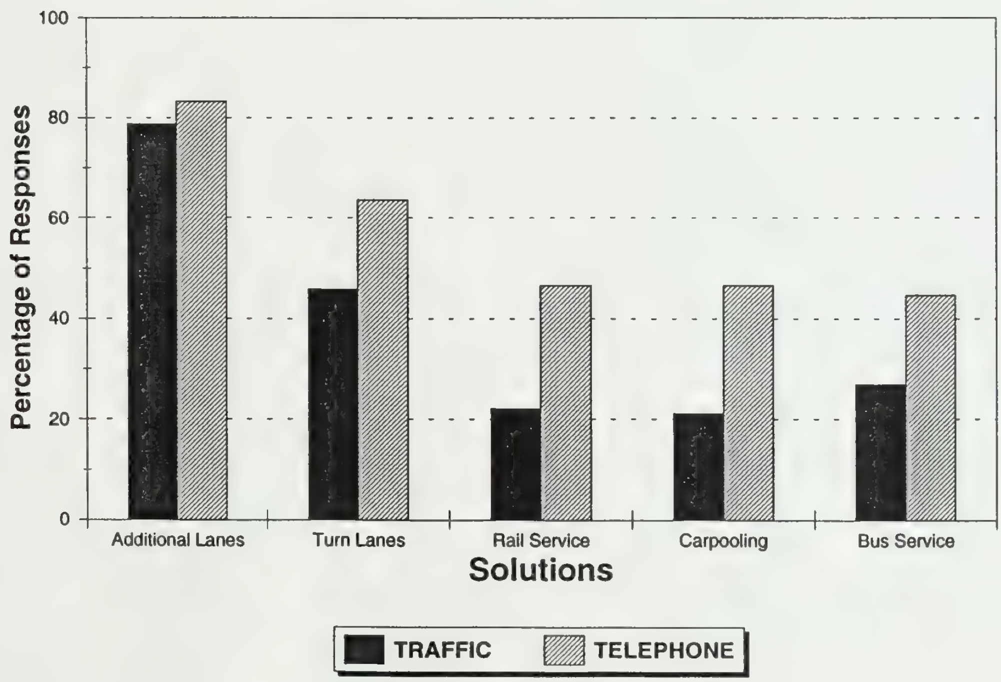
FIGURE 1-10
COMPARISON OF TRAFFIC AND
TELEPHONE SURVEYS

HAMILTON-LOLO SURVEY COMPARISONS
TRAFFIC VS. TELEPHONE



HAMILTON-LOLO SURVEY COMPARISONS
TRAFFIC VS. TELEPHONE



1.8 ROADWAY DEFICIENCIES

The actual roadway itself has several deficiencies resulting from its age, its condition, and the improvements in standards over what was in use at the time various segments were constructed. The subsections that follow will describe needs for improvements in terms of geometry, pavement structure, and physical safety. Photographic representations of these deficiencies are given in Figure 1-11.

Existing Highway: US Highway 93 is predominantly a rural 2-lane facility throughout the length of the project corridor. In areas of concentrated development or junctions with other important roadways (e.g. Woodside, Victor, Stevensville Y Intersection, and Florence), the highway has been expanded to 4-lanes or 5-lanes to facilitate access, reduce congestion, and improve safety for turning movements. The highway does have some turning lanes at major intersecting roads in rural undeveloped areas of the corridor to provide greater safety.

Other than the small areas of urban development just mentioned, the highway is typically in a rural setting with generally flat terrain, punctuated by occasional rolling hills, moderately deep drainages, and some old stream meander areas. Speed on the highway is posted at 55 mph (90 km/h), except in the areas of development where a 45 mph speed (70 km/h) has been posted for improved safety and operation.

Existing facilities in the corridor were constructed in several segments at various times as given in Table 1-7. About two-thirds of the highway is 40 to 57 years old with no major improvements since initial construction other than some overlay, maintenance, or safety projects. The other one-third of the highway is now 21 years old and has had no improvements since initial construction.

TABLE 1-7
US HIGHWAY 93 CONSTRUCTION BACKGROUND

Milepost Segment		Length (km/mi)		Width (m/ft)		Year Built	Year Overlay	Other Improvements
To	From							
49.2	49.7	0.8	0.5	9.1	30	1939	1952, 1982	
49.7	59.0	15.0	9.3	7.6	25	1952	1982	
59.0	73.5	23.3	14.5	9.7	32	1956	1961	seal coat 1962
73.5	74.3	1.3	0.8	13.4 to 20.7	44 to 68	1975	---	
74.3	74.8	0.8	0.5	20.7	68	1975	---	
74.8	83.2	13.5	8.4	11.0	36	1975	---	

Sharp Curves: Throughout the highway corridor there are several substandard curves. These sharp curves create a concern for safety, as they are difficult to drive (especially at night), have limited sight distance, and require speed adjustments to safely negotiate.

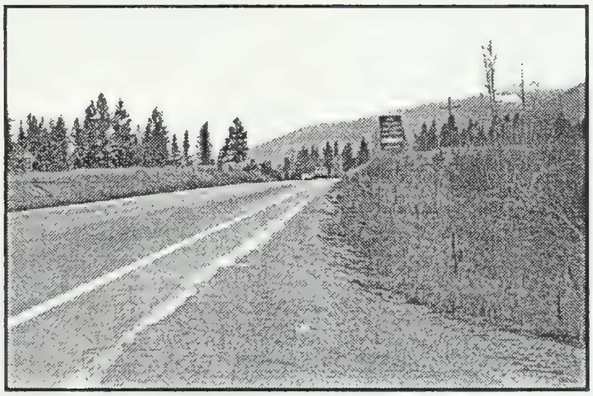
At the Bitterroot River crossing just north of Hamilton (milepost 49.7) there is an existing curve with a radius of 349 m (1146 ft, D=5°00'). For a 100 km/h (60 mph) design speed, AASHTO guidelines recommend a minimum curve radius of 411 m (1348 ft, D=4°15'). Other locations with substandard curves include a curve at milepost 84.3 with a curvature of 388 m (1273 ft, D=4°30') and at milepost 86.2 with a curvature of 349 m (1146 ft, D=5°00'). There is also a "kink" in the alignment near milepost 79.9 ("Old Highway 93") that often causes inattentive drivers to briefly cross into the opposing traffic lane.

FIGURE 1-11
TYPICAL ROADWAY DEFICIENCIES


Heavy Traffic


Narrow Shoulders

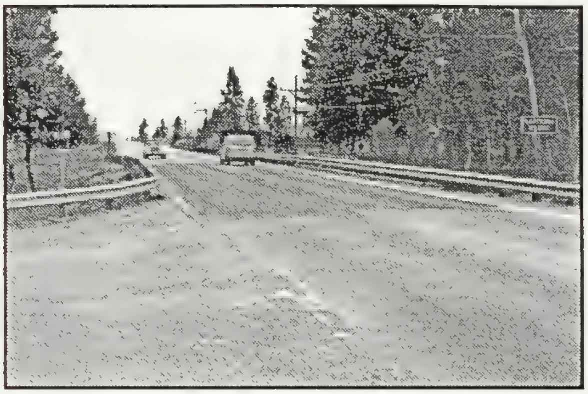

Steep Side Slope


Poor Vertical Sight Distance


Strip Development


Inadequate Mailbox Turnouts

FIGURE 1-11 (cont.)
TYPICAL ROADWAY DEFICIENCIES



Restricted Width Bridges

Clear Zone Intrusions

Closely Spaced, Uncontrolled Accesses

Pavement Rutting

Restricted Horizontal and
Vertical Clearances

Sharp Horizontal Curvature

FIGURE 1-11 (cont.)
TYPICAL ROADWAY DEFICIENCIES

“Alligator” Cracking (base failure)

Potholing and Pavement Breakup

Steep Grade: According to AASHTO guidelines for a 100 km/h (60 mph) design speed the maximum grade for level terrain is 3% and for rolling terrain the maximum grade is 4%. At the Bass Creek Hill (between mileposts 68.9 and 70.3) there are existing grades at or near these values. This portion of the highway also has poor vertical sight distance; therefore any proposed construction improvements to the highway should plan to improve this section.

Inadequate Cross-Section: Current design standards dictate the desired width of roadway surface and shoulders that need to be used to accommodate a given volume of traffic during the peak hour. According to existing traffic volumes on the facility, it should have a 7.2 m (24 ft) travel way with 2.4 m (8 ft) paved shoulders as a minimum. The existing facility does have the recommended travel way width but not the shoulder width. From milepost 49.2 to 74.3 the shoulders are 0.6 m (2 ft) or less, and from 74.3 to 83.2 the shoulders are 1.2 m (4 ft) on the west and 1.8 m (6 ft) on the east.

The recommended wider shoulders are needed for such benefits as room for bicycle and pedestrian activities, emergency parking, increased driver comfort, and emergency maneuvers. Where substandard shoulder widths exist the highway does not meet current federal and state standards.

Structures: US Highway 93 crosses numerous small streams and creeks. Where bridge structures are used (11 locations, see Table 3-17), they are all deficient in width (8.5 m vrs. 12.2 m by standard). Many of these structures are constructed of treated timber, which is a hazardous material and has begun to deteriorate in some instances. In addition, the Silver Bridge over the Bitterroot River (milepost 49.5) is in need of replacement due to its age (57 yrs), condition, limited remaining service life, and inadequate horizontal and vertical clearance.

Pavement Structure: Most of the existing facility was constructed several decades ago with only minor improvements since that time. In many areas, the foundation is insufficient for present and projected traffic loads and heavy vehicles; therefore the pavement has deteriorated. The most prevalent forms of pavement deterioration include rutting, "alligator" cracking, potholing, and bleeding (where asphalt oozes out from between pavement aggregates and onto the surface where a slick spot is formed). Thermal cracking and edge break-up are other signs of pavement age, distress, and deterioration. Table 1-8 reviews pavement conditions of the existing facility.

TABLE 1-8
SUMMARY OF EXISTING PAVEMENT CONDITIONS

Station By Milepost	CRACKING			RUTTING	PATCHING	DEFORMATION	COMMENT
	Transverse	Longitudinal	Alligator				
49 to 50							
50 to 51	few			slight to moderate	minor	minor	recent overlay Blodget Creek Approach - poor
51 to 52	few			noticeable		minor	
52 to 53	few			noticeable		minor	
53 to 54	some			moderate	minor/low	little	
54 to 55	fewer			moderate		minor	Mill Creek Bridge - deformation and broken pavement at bridge ends
55 to 56	uniform			moderate		little to no	
56 to 57	few			moderate		little to no	

TABLE 1-8
SUMMARY OF EXISTING PAVEMENT CONDITIONS

Station By Milepost	CRACKING			RUTTING	PATCHING	DEFORMATION	COMMENT
	Transverse	Longitudinal	Alligator				
57 to 58	few				some	high terrace - good ride	S. Fork Bear Creek Crossing - bad, small circular cracks (settlement at begin of overlay)
58 to 59	few	58.2 - some				slight	N. Fork Bear Creek Bridge - not as bad
59 to 60	tight spaced to Sweathouse Creek	through Victor		moderate		moderate	Beginning of new surface - appears to be with 2 overlays Sweathouse Creek approaches - Bad
60 to 61	close space	minor				moderate	Very minor deterioration at Big Creek Bridge
61 to 62	close spacing	yes	beginning to form			slight	
62 to 63	close (2-3')	some		moderate	none	moderate	
63 to 64	close	some	beginning to form	slight to moderate		moderate	
64 to 65	very close	some		slight to moderate			
65 to 66	very close	some				slight to moderate	McCalla Creek - bad deformation
66 to 67	very close	some/random		minor			New surface (chip seal) slight settlement @ McCalla Creek Bridge and Kootenai Creek Bridge
67 to 68	very close	---		moderate		slight	newer overlay through Stevensville deformation to Bass Hill approach
68 to 69	very close	---		minor	some (Bass Hill)	moderate	
69 to 70	close	some		moderate		moderate	high groundwater in Bass Hill cut
70 to 71	closely spaced	few		moderate	none	moderate	
71 to 72	very close	few		moderate	none	moderate	
72 to 73	common	none	none	moderate		moderate - poor	new overlay at 72.5±
73 to 74		none		moderate		moderate - poor	
74 to 75	few	slight				poor - foundation	passing lane through Florence
75 to 76	close spaces	common				some deformation	reflections through the old surface some deformation NB driving land (construction-joint)
76 to 77	close	common		minor	76' large patch 800' (2x)	moderate	HGW terrain - foundation poor

TABLE 1-8
SUMMARY OF EXISTING PAVEMENT CONDITIONS

Station By Milepost	CRACKING			RUTTING	PATCHING	DEFORMATION	COMMENT
	Transverse	Longitudinal	Alligator				
77 to 78	close	common for traffic pattern	some beginning	minor	large patch E 77.8 Car Road - long patch	moderate	longitudinal & rutting are combining to form alligator cracking
78 to 79	close	common	some	construction, moderate		moderate	
79 to 80		common	some	construction, moderate		moderate	
80 to 81	closely spaced	yes	beginning to form	moderate	common		
81 to 82	closely spaced	minor	beginning to form	moderate, more on 5B		moderate	
82 to 83	tight space	tight space	some beginning to form	moderate, more on 5B		moderate	Lolo Creek Bridge - Big (recent car bumps at both bridge ends)

Safety Deficiencies: Safety standards for highways have vastly improved since the time the existing facility was originally constructed. Significant improvements have been made in the standards for sideslopes, clearances to obstructions, and the use of auxiliary and turning lanes.

Current federal and state standards call for gentle sideslopes to allow an errant vehicle the possibility of correction without overturning. The steepness of the sideslope varies with the height of the fill with 6:1 (rate of horizontal change to rate of vertical change) recommended on low fills, 4:1 on intermediate height, and 3:1 on very high fills. If guardrail is provided then slopes can be as steep as the construction materials will allow. Considerable portions of the existing highway in rural areas from milepost 49.2 to 74.3 have sideslopes of 2:1 or 1½:1 with no guardrail present. Vehicles leaving the highway and traversing these slopes are subject to overturning.

Another improved standard calls for a "clear zone" for a certain distance from the edge of the highway where no vertical obstructions or grade disruptions are allowed. This also allows a vehicle leaving the roadway the possibility to safely correct without collision. For a 100 km/h (60 mph) design, a clear zone of 12.8 m (42 ft) should be provided from the edge of the travel lane unless curb and gutter or guardrail is provided. Many locations of the existing highway (primarily from milepost 49.2 to 74.3) have nowhere near this amount of clearance, and the obstructions within them (utility poles, substations, mailboxes, etc.) are not designed to safely break away should a collision occur.

Current safety standards also call for separation of mailbox facilities from the traveled portion of the highway. Usually this is accommodated through provision of a mailbox turnout or, in some cases, moving the mailboxes off to a side street or frontage road where they can more safely be accessed. Practically none of the mailboxes in the project corridor are currently accommodated in this manner; nearly all are on the edge of the roadway where stopping vehicles create a safety concern and visual obstruction. Some mailboxes create a collision hazard if they are not designed to yield or give-way during a vehicle collision.

Lack of acceleration/deceleration and turning lanes, particularly at major intersections, is also another major deficiency. Aside from the obvious improvement to the flow of traffic, the lanes also separate slower moving

or stopped traffic from the main stream, reducing the potential for accidents. Acceleration lanes are particularly important to allow merging vehicles to reach through traffic speed prior to entering the main traffic flow.

Other roadway safety deficiencies are related to approaches. In some cases the steepness of the approach and the limited right-of-way have resulted in no "landing" where vehicles may safely stop and correctly assess traffic conditions prior to entering the highway. In other cases, the density (or number of approaches in close proximity) is sufficiently high to create a number of varied turning movements and temporary visual obstructions. Where the usage of such densely located approaches is high, the potential for accidents is increased.

Statement of Need: The existing highway is old, has seen little improvement since initial construction, and was designed to inferior standards in comparison to those currently in use. Sharp curves steep grades, inadequate shoulders, narrow bridge widths, insufficient and deteriorating pavement structures, steep sideslopes, inadequate clear zones, and lack of mailbox turnouts and turning lanes all represent deficiencies in the existing facility that need correction.

1.9 MODAL INTER-RELATIONSHIP

US 93 is a major transportation link in the area. In connecting the Bitterroot Valley with the large City of Missoula, it not only provides for the commuting and economic opportunities earlier discussed, but also allows for interconnection with other forms of transportation for people and goods.

One connection is with the Missoula Airport where major commercial airline flights are available connecting to yet other major airline hubs in Montana and the Pacific Northwest. Missoula also houses a major railroad switching yard providing freight railway service to the rest of the country. Public bus facilities are also housed in Missoula, including both national carriers and a local mass transit system that has occasionally served communities in the Bitterroot and may one day connect with the park-and-ride lots recommended for implementation as a part of this project.

Lastly, there are many pedestrian and bicycle facilities in Missoula, particularly associated with the University of Montana campus. During good weather there are a considerable number of individuals who walk or ride bicycles from the Bitterroot area into the City and US 93 is the route they take. Additionally, US 93 within the project corridor and to points south is a prominent link in a transcontinental bicycle path being promoted by bicycle organizations and State tourism groups.

Statement of Need: Important links with major intermodal transportation facilities are provided by the existing highway. There is a need to protect and enhance the facility's ability to continue providing significant intermodal connection.

1.10 SUMMARY OF PURPOSE AND NEED

Summarizing the chapter, the following items briefly highlight the purpose and need for the proposed action:

- US 93 is a major arterial highway in the regional transportation network. Other major actions in the project area have added emphasis to its important role in the transportation system. Current physical limitations and the high degree of traffic congestion on the existing facility seriously inhibit its ability to function as a vital transportation link.

- Growth in the area has been extremely high and is expected to continue into the foreseeable future. The existing facility is inadequate to handle the growth of the area that has already occurred and improvements are necessary to accommodate anticipated future growth.

- US 93 carries nearly twice the average daily traffic of any other rural 2-lane facility in Montana. The existing highway capacity is inadequate to safely and efficiently handle existing and projected traffic. This has resulted in a high degree of traffic congestion and increased impacts to noise and air quality within the corridor. Significant reduction of traffic and/or improvement to capacity are needed to bring the level of service to recommended standards.

- Traffic congestion and restrictive geometry of the existing highway contribute to accident potential. Crossing deer are also a major source of accidents and property damage. High access density and major roadway junctions at unsignalized intersections are also contributing factors. There is a need to improve safety and reduce the number of accidents in the project corridor by improving transportation facilities.

- The condition and function of US 93 in the project corridor play an active role in meeting a number of social and economic needs. Protection and enhancement of transportation in the corridor is needed to provide compatibility with land use planning, facilitate or discourage access where appropriate, and to provide for economic stimulation by meeting stated goals in local economic development plans. There is a need to preserve community cohesion and character through controlling strip growth and keeping future growth within reasonable bounds. There is also a need to respond to significant public demands for transportation improvements by providing environmentally responsible alternatives with minimal impacts at the earliest possible date.

- The existing highway is old, has seen little improvement since initial construction, and was designed to inferior standards in comparison to those currently in use. Sharp curves steep grades, inadequate shoulders, narrow bridge widths, insufficient and deteriorating pavement structures, steep sideslopes, inadequate clear zones, and lack of mailbox turnouts and turning lanes all represent deficiencies in the existing facility that need correction.

- Important links with major intermodal transportation facilities are provided by the existing highway. There is a need to protect and enhance the facility's ability to continue providing significant intermodal connection.

1.11 REFERENCES

1. A Policy on Geometric Design and Highways of Streets - American Association of State Highway and Transportation Officials (AASHTO); Washington D.C. - 1994 Edition

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CHAPTER 2.0

ALTERNATIVES

ALTERNATIVES

2.1 INTRODUCTION

This chapter presents and describes various alternatives considered for the proposed action in meeting the purposes and needs stated in Chapter 1.0. Requirements of the National Environmental Policy Act (NEPA)[1] call for the consideration of a full range of reasonable alternatives, including the "no action" alternative. Reasonable alternatives are defined[2] as those that are technically, economically, and environmentally practical and feasible to satisfy the stated purposes and needs for this project.

The following information describes the development, initial screening, and selection process for determining the alternatives to be studied in this document. Descriptions are given for those that are considered reasonable for carrying forward into further study. A detailed description of the preferred alternative for the proposed action is also presented. It should be emphasized that final selection and approval of an alternative will not be made until the alternatives, impacts, and written comments on them resulting from this environmental document and its presentation at a formal public hearing have been fully evaluated.

The specific evaluation of alternatives carried forward into the study is presented in Chapter 4.0 - *Environmental Consequences*. Individual impacts are presented there along with a comparison between alternatives for any given area of consideration. A summary section at the end of this chapter presents brief, overall comparisons of all the alternatives relative to the specific impacts identified in Chapter 4.0 and the purposes and needs for action set forth in Chapter 1.0.

2.2 DEVELOPMENT OF ALTERNATIVES

Alternatives for the proposed action were developed and considered for study only after intense efforts at public involvement and agency coordination. Elements of this effort followed a public involvement plan[3] developed and announced to the public at the outset of the project for the purpose of guiding this process. Basic components of the development process were:

- letter of intent
- property owner contacts
- telephone and traffic surveys
- initial selection
- public scoping meetings
- focus groups
- advisory committee input
- interdisciplinary team input
- refinement to preferred alternative

Further description of the developmental process is given in the subsections that follow.

Letter of Intent: A letter of intent was submitted by the Federal Highway Administration and published in the Federal Register on September 17, 1992. This letter notified the public of the intent of the proposed action and invited both agency and individual response. A separate letter of intent was mailed to property owners, agencies, and other interested parties on November 27, 1992. This letter, sent to approximately 550 locations, described the intent to study the corridor and invited participants to give input concerning the project.

Property Owner Contacts: Current property owners within the corridor were identified through the County tax records. Contacts were made with nearly all property owners via telephone and via mail to solicit input on the project, invite participants to public meetings, and provide information on potential alternatives through the use of newsletters. Property owners were mailed individual invitations to public meetings.

Telephone and Traffic Surveys: Telephone and traffic surveys were conducted which in part allowed participants to identify both perceived problems and potential solutions to them. This information was used in the initial development of alternatives.

Initial Selection: To help "seed" public participation in the development of alternatives, an initial list of potential alternatives was formulated from previous experience on other similar projects and a planning document for the development of rural arterials[4]. This information was used with the telephone and traffic survey results only to give suggestions and "starting" places to the public for use as a springboard for developing potential alternatives for the proposed action.

Public Scoping Meetings: Public scoping meetings were held for the purpose of developing reasonable alternatives to be studied. The scoping meetings were held in three sets of three meetings each.

The first set was held in December 1992 and was directed primarily at presenting plans for study and to request public input on issues and possible solutions. The second set was held in April 1993 and focused principally and primarily on the development of alternatives. Guidance and input was received from the public which had a substantial bearing on the alternatives recommended to carry forward into this study. The last set of scoping meetings was held in March 1994 to again present alternatives and review the results of various impact studies completed with relation to those alternatives.

Focus Groups: Seven focus group sessions were formed with seven to fifteen persons randomly selected by computer from the area telephone book. The groups were formed to try and identify those methods of reducing traffic on the highway ("no build" alternatives) that would best be supported. The most popular TDM alternatives concluded by the focus groups helped identify those that should be carried into this study.

Advisory Committee: A citizen's advisory committee consisting of community leaders and representatives from groups or organizations reflecting the interests of citizens within the project was formed to help steer the study process. A special charge to the committee was to assist in the development of project alternatives. The committee met numerous times prior to development of this document and played a prominent role in the narrowing of alternatives, particularly selection of the preferred alternative.

Interdisciplinary Team: An Interdisciplinary team representing the interests of several governmental or regulatory agencies was formed to help guide the regulatory concerns related to the development of this project. Numerous meetings were held with the interdisciplinary team prior to preparation of this document, including specific discussions of reasonable and practicable alternatives that could be presented to the public and in the document for further consideration.

Refinement to Preferred Alternative: As a part of the on-going public involvement process and coordination with the Citizen's Advisory Committee and the Interdisciplinary Team, the alternatives that had been developed were continually refined to develop a core group of the most reasonable and practicable alternatives for consideration. Later in the process this focus was directed at the potential combination of elements of each alternative in formulating the basis for the preferred alternative.

2.3 OVERVIEW OF ALTERNATIVES CONSIDERED

Proper transportation planning and adherence to environmental regulations require that a range of alternatives be considered for any proposed action. The range of alternatives considered at the outset of the planning effort was expanded, narrowed, or refined in response to the public involvement efforts (previously described) and the initial results of impact studies. The range of alternatives may be summarized in general as follows:

- taking no action, leaving conditions in "status quo" and providing no improvements
- managing vehicular traffic to reduce or control congestion without additional road construction (transportation demand management)
- rehabilitating the existing facility to achieve maximum utilization
- constructing minor improvements in an effort to improve safety and capacity
- utilizing the corridor of the existing facility to reduce environmental impacts and potential costs of possible improvements built on new alignments
- providing parallel corridors or alternate traveled ways to reduce the demand and/or improve safety on the present facility
- undertaking major new construction or reconstruction to provide capacity and improve safety
- providing design amenities to improve efficiency and enhance safety

After the initial development of potential alternatives, it became apparent the range of alternatives could be grouped together under major classifications that would facilitate impact evaluation and data presentation. The three major categories that emerged were:

- "No Build" Alternatives
- "Build" Alternatives (construction)
- Realignment Alternatives

The grouping of the range of alternatives into these major categories is presented in Table 2-1.

TABLE 2-1
RANGE OF ALTERNATIVES

"No Build"	"Build"	Realignment
No Action	Modified 2-lane	Sapphire Freeway
Park-and-Ride	3-lane (overlay and widening)	One-way "Couplet"
Commuter Bus Service	4-lane Undivided	Urban Bypasses
Passenger Rail Service	4-lane Divided with Median and Turn Lanes	Silver Bridge Realignment
Rehabilitate Existing	5-lane	Bass Creek Hill Realignment

In addition to the construction alternatives, a list of amenities was developed that could be applied to construction alternatives as necessary or at specific locations in the corridor to improve efficiency and

enhance safety. Although not evaluated as alternatives per se, it was important to develop the list of amenities in the event their incorporation may result in additional or significant impacts. Major amenities developed for consideration included:

- access control
- pedestrian facilities
- bicycle facilities
- traffic signals
- auxiliary lanes
- frontage roads
- livestock crossings
- curb and gutter sections

Further description and definition of each of the developed alternatives will be given in one of the following two sections, as appropriate, as to whether the alternative was eliminated from further study or advanced for additional consideration of potential impacts. While the above groupings assist in delineating and quantifying the impacts associated with individual alternatives, it should be remembered the preferred alternative will most certainly be some combination of these ideas to best satisfy the stated purposes and needs at given locations throughout the corridor.

2.4 ELIMINATED ALTERNATIVES

The following information will more fully describe alternatives not carried forward into the primary impact analysis. The main reasons why these alternatives were eliminated are also given.

Rehabilitation of Existing Facility: This alternative would provide for rehabilitation and minor associated improvement of the existing highway in order to achieve maximum utilization of existing facilities. Such improvements may include asphalt overlay to improve pavement conditions, signing and pavement marking for greater safety and improved traffic flow, addition of minor turning lanes where warranted, and implementation of other safety improvements such as providing mailbox turnouts and installing guardrail where needed.

While this alternative does provide some improvement over existing conditions, it falls short of meeting the stated purposes and needs in major ways:

- The capacity and level of service would fall far short of needed levels in the near term and have no chance for accommodating future growth;

- Major safety concerns and roadway deficiencies would not be addressed such as sharp curves, narrow shoulders, restricted width structures, poor approaches, and accident potential related to congestion;

- It would not be consistent with area economic development plans calling for improvement and enhancement of US 93; and

- It would not be publicly acceptable due to its inability to reduce congestion and provide for greater capacity and improved level of service.

This alternative was eliminated from further consideration early in the process for these reasons and the absence of any public support for it.

Sapphire Freeway: During public scoping meetings several people suggested construction of a controlled access freeway on the east side of the Bitterroot Valley along the foot of the Sapphire Mountains. Conceptually this would carry through-traffic, including commuters and tourists, through the Valley -- providing the needed capacity and level of service and reducing congestion in the US 93 corridor by leaving it for local traffic and access. Figure 2-1 depicts the conceptual location of this alternative which is considered to be typical of other possible new location alignments.

Although the alternative was developed almost entirely from public input, it never gained widespread or general public support. The alternative would meet most of the stated needs except minimizing environmental impacts and being compatible with local economic plans. Negative comments received on it centered around the substantial impacts the alternative would have in terms of:

- right-of-way acquisition (392 hectares [970 acres], ten more times than the proposed action)
- construction costs above and beyond other alternatives available ($70 Million, twice the proposed action)
- farmland disruption (estimated 130 hectares [320 acres])
- loss of habitat (estimated 80 hectares [194 acres])
- potential for significant land use change (undeveloped and agricultural converted to residential and commercial)
- potential economic impacts to businesses already established (takes away traffic)

For these reasons this alternative was eliminated from further discussion and such action was generally supported by the public after presenting the reasons therefor in public meetings.

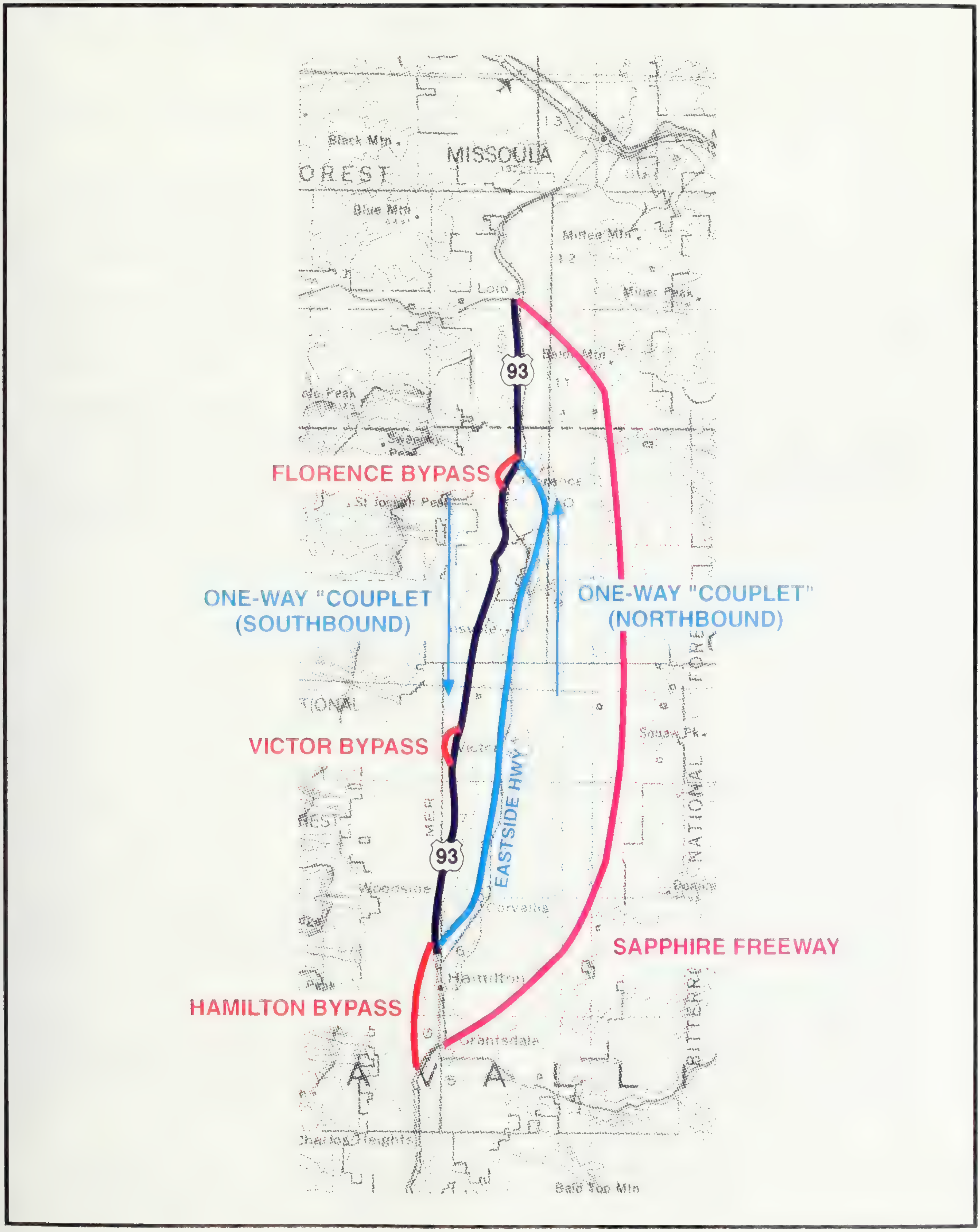
One-Way Couplet: This alternative is conceptually depicted in Figure 2-1. Through most of the corridor being studied, there is essentially the arterial corridor of US 93 and a parallel collector corridor known as the "Eastside Highway". To relieve congestion and improve safety by reducing the number of required turning movements, the idea emerged for creating a one-way "couplet", by which southbound traffic would continue to use US 93 one-way southbound and northbound traffic headed toward Missoula would use the Eastside Highway as a one-way facility northbound. The couplet would exist from Hamilton (where the routes interconnect) northward to Stevensville where the routes again join together in the US 93 corridor.

Some improvement of US 93 would be required for safety considerations and pavement condition. Major improvements of the Eastside Highway to bring it up to primary standards, including straightening curves, removing alignment kinks, easing grades, widening the roadway, flattening sideslopes, and requiring significant right-or-way would be needed. This alternative has the potential to meet most of the stated purposes and needs but would likely adversely affect land use (converting undeveloped land in the Eastside Highway area to residential and commercial), community cohesion (severely restricting access and movement through communities), and would create greater impacts to the physical environment (widening and straightening of the Eastside Highway).

The public was generally non-supportive of the idea; citing confusion, having to travel circuitous rather than direct routes, possible disruption to the economy by forcing traffic away from existing businesses, growth impacts in the Eastside Highway area, and the cost of developing and maintaining two major facilities in the valley rather than concentrating on one. This concept was initially set forth in the telephone and traffic surveys and received so little support in the surveys and public meetings that it was never really given serious consideration.

Urban Bypasses: During the scoping meetings it was suggested that bypasses of "urban" areas might be made to facilitate traffic flow and relieve the urban traffic congestion. Analysis of transportation patterns and components suggested the mix of through traffic and local traffic seeking access to business or commercial centers was such that the concept of bypasses would provide considerable relief from traffic congestion

FIGURE 2-1
CONCEPTUAL ALTERNATE ROUTES



without significant harm to the local economy. Indeed, if congestion were allowed to continue in these areas in the future, shoppers may begin to prefer other less congested business areas than the urban centers.

Accordingly, the concept of constructing bypasses around the communities of Hamilton, Victor, and Florence was proposed. Conceptual routing is shown on Figure 2-1, which uses least-developed areas and is considered to be typical of other possible bypass routes.

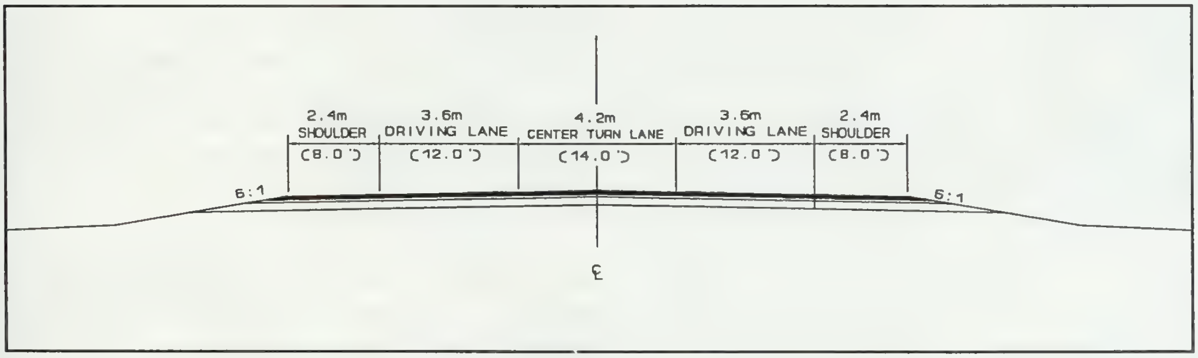
Opposition to the concept of urban bypasses was immediate upon presentation to the public. Concerns raised included:

- potential economic impacts on existing businesses and commercial areas
- further disruption of residential or farmland areas for construction of bypasses
- state law against bypasses without consent of local government
- definite lack of public acceptance

A straw poll vote taken at a well-attended public scoping meeting in Hamilton was nearly unanimous against the concept of urban bypasses. The alternative of urban bypasses was quickly laid aside in view of this apparent mandate and the fact that by themselves, the bypasses fall far short of meeting the purposes and needs for improvement.

3-lane Highway (Overlay and Widening): The concept of constructing a 3-lane highway, consisting of a traffic lane in each direction separated by a center two-way turning lane to facilitate access, was presented to the public. The function of the center turning lane is to provide a safe haven for those seeking access into adjacent residences and businesses and also improve the efficiency and capacity for carrying through traffic by protecting it from disruption by left turning vehicles. Figure 2-2 is a cross-sectional representation of this configuration:

FIGURE 2-2
3-LANE HIGHWAY (OVERLAY & WIDENING)



Other advantages of this typical section include a narrower overall width (reducing impacts), lower cost of construction, and the opportunity to utilize the existing facility by widening and then overlaying the entire construction with a new riding surface.

Unfortunately this alternative quickly earned the endearment of "suicide lane" in the public meetings. Much opposition was voiced over its accident potential, particularly in winter months when lane delineations are not visible and the accompanying through traffic pavement width would be perceived as too narrow to provide adequate clearance for safety maneuvers around turning or errant vehicles. The lack of widespread support in the face of apparent opposition, together with concern that this solution would fail substantially to meet

several of the purposes and needs (capacity, level of service, growth accommodation, safety and public demand) suggested that this concept need not be carried further.

In summary, alternatives were eliminated from further consideration for their failure or shortcomings in several of the following general areas:

- meeting the stated purposes and needs
- creating excessive, additional, or unwarranted impacts
- not being economically feasible
- lacking public acceptance

2.5 DESCRIPTION OF ALTERNATIVES ADVANCED

The remaining alternatives were carried forward for further examination and analysis with regard to potential impacts. The following information provides more description of the advanced alternatives including maps, photographs, typical sections, and other data helpful to understanding the proposals.

"No Build" Alternatives: These alternatives were developed around the concept of trying as much as possible to not disturb the existing highway while providing the means to meet the stated purposes and needs wherever feasible. Example photographs of some "no build" alternatives are shown in Figure 2-3 and further description is presented in the subsections that follow.

- No Action: This alternative would leave the existing highway in its present condition with no improvements undertaken beyond routine maintenance and no changes to operation. Although this alternative does not address the stated needs for transportation improvements, it does provide a good basis of comparison for the evaluation of impacts associated with other alternatives beyond conditions already existing in the corridor. The only possible actions undertaken by this alternative would be routine maintenance and safety projects meeting localized needs (e.g. additional turning lanes where warranted, improved signing or markings, etc.; the same as is presently being done in the corridor).

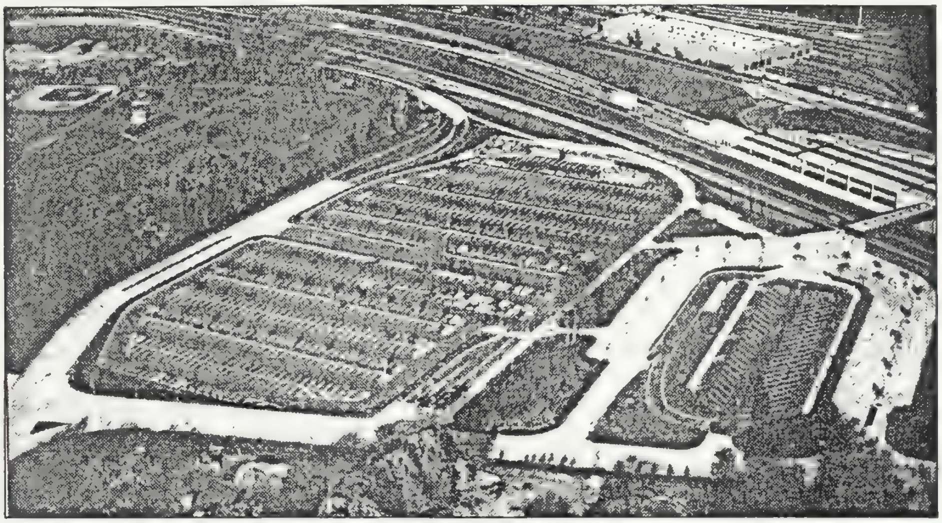
- Park-and-Ride: The establishment of a park-and-ride system as an alternative for improving transportation in the corridor includes examining potential locations for commuter parking lots and the mechanisms for establishment of a park-and-ride plan to encourage car and van pooling for commuters between Missoula and the Bitterroot Valley. Figure 2-4 identifies potential locations for the establishment of the park-and-ride lots, which fall principally near the intersection of major traffic feeders with US 93 or at major population concentrations within the corridor.

  Physically, the park-and-ride lots would consist of a paved area providing rows of parking spaces. The area would likely be fenced and well lighted to provide additional security. At least two accesses would be provided and the layout of traffic flow through the facility would allow for service by commuter buses or large vans. Enhancements could including constructing a small shelter incorporating a waiting area, display boards for park-and-ride or public transit information, and restrooms.

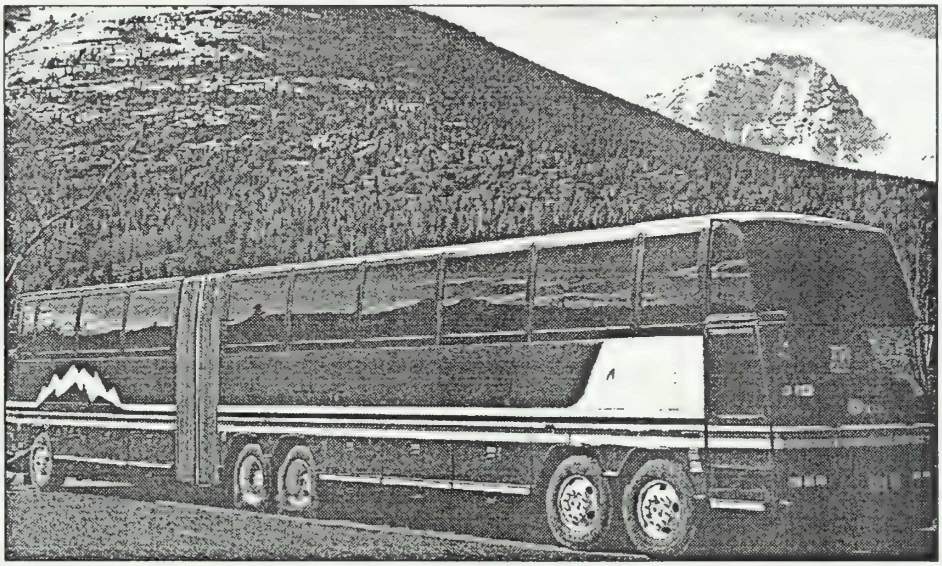
  Planning for this alternative includes not only the physical location, size, and layout of parking facilities, but also the implementation and management steps necessary for them to be functional and effective. It is likely the facilities would be constructed by the Transportation Department. However, the organization, management, and maintenance of the park-and-ride system would be achieved by a local transportation management association (TMA), which would not only coordinate ridership but would

FIGURE 2-3
PHOTOS OF TYPICAL "NO BUILD" ALTERNATIVES

Park and Ride Lot



Commuter Bus Service



Passenger Rail Service

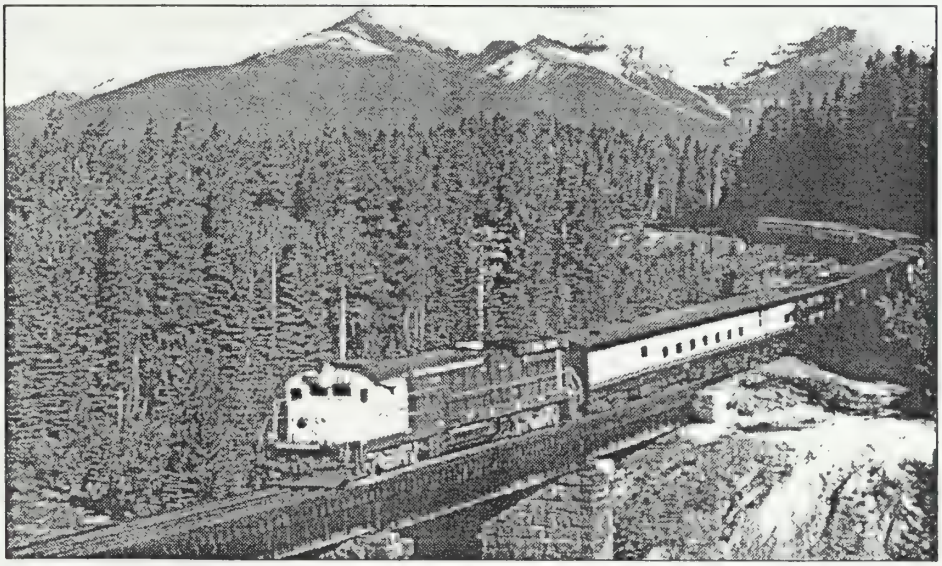
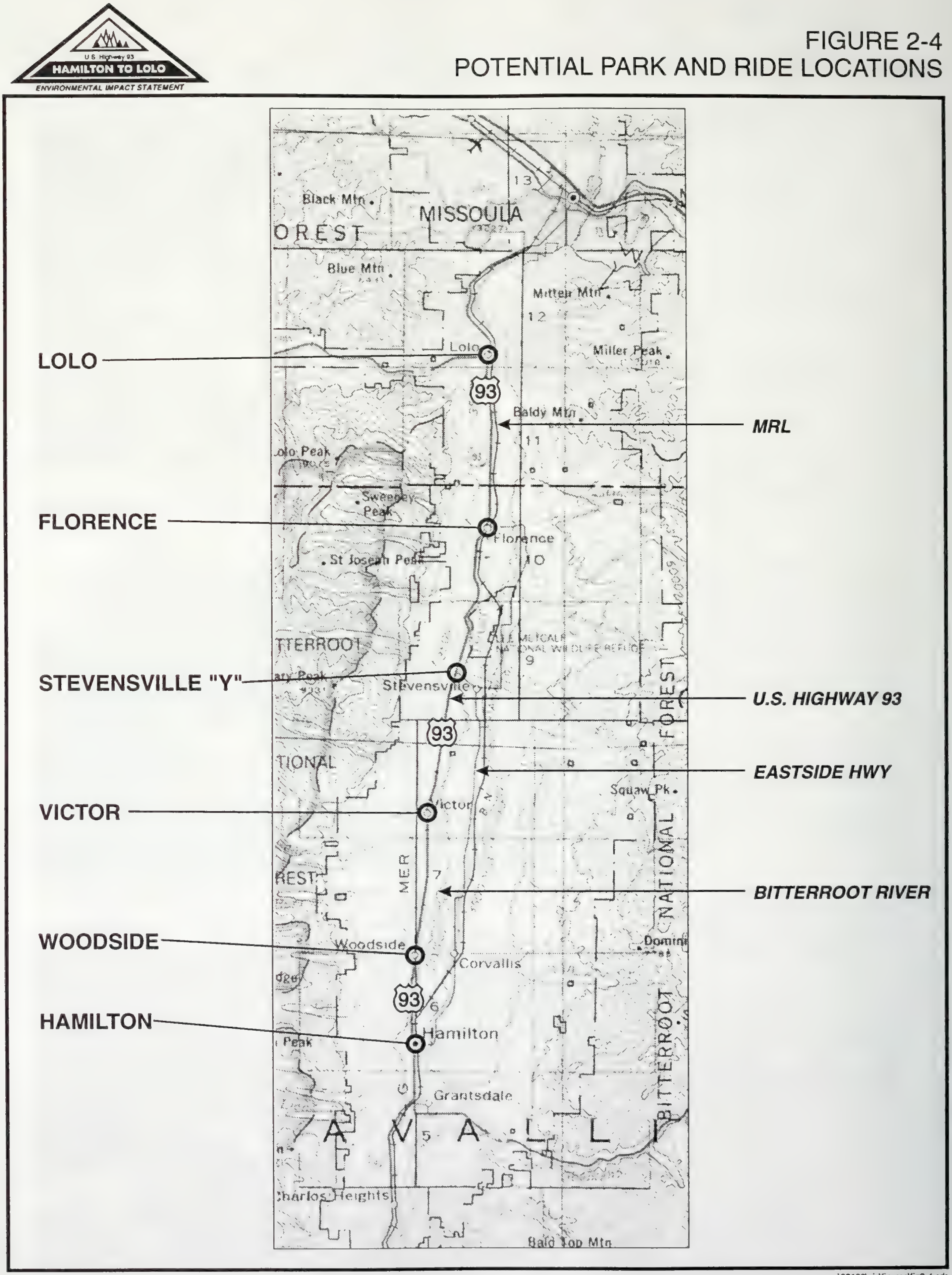


FIGURE 2-4
POTENTIAL PARK AND RIDE LOCATIONS



\92100\eis\figures\fig2-4.cdr

also provide for the massive public education necessary to encourage widespread usage of the system.

- Commuter Bus Service: This alternative encompasses establishment of a bus transportation system (public or private) within the corridor to facilitate commuting. This would include identification of feasibility and steps for implementation, recommended management plan, etc.

  Route locations and schedules are unspecified; assuming only that the system would stop at major population centers, park-and-ride lots, other locations at times, and frequency conducive to encouraging greatest use.

- Passenger Rail Service: Pre-project input and public survey information suggested an appreciable degree of support for potentially developing a passenger rail service (public or private) through the corridor to Missoula. Likely, this would be set-up to follow an existing railroad line that roughly parallels the highway through the corridor as was shown in Figure 2-4.

  The existing track between Hamilton and Missoula is rated at a top speed of 55 km/h (35 mph) and currently serves for freight purposes only. Under this alternative, the entire length of track would be replaced in order to run commuter trains at higher speeds (at least 70 km/h [45 mph]). Additionally, many crossings of the track would be upgraded with signals and crossings gates. Private crossings would likely be eliminated or grouped together where possible.

  Montana Raillink Engineers propose[5] that a commuter train running between Missoula and Hamilton would need three stations incorporating parking facilities located at Hamilton, Stevensville, and Missoula. If service beyond two trips a day were required, then a centralized traffic control system would be installed along the entire route for additional safety.

  Two sub-options on the type of rail service were investigated. The first was based on traditional railroad passenger service utilizing a three car train with service twice daily and a capacity of 200 passengers. The second option looks at the use of an innovative type of passenger vehicle that can operate both on the railroad and on the highway. This type of system is in its infancy (prototypes in France), but would provide a much greater degree of flexibility than the more traditional fixed rail service.

"Build" Alternatives: In order to respond to one of the principle purposes and needs for improving transportation in the corridor (reducing congestion and providing additional capacity), several construction alternatives were advanced that are based on reconstructing the highway to provide adequate capacity and the desired level of service. Figure 2-5 shows photographic examples of the "build" alternatives described in the following subsections. Figure 2-6 shows the typical sections for these alternatives.

All alternatives would incorporate 2.4 m (8 ft) shoulders, which could also be expanded to become right hand turning lanes at significant intersections. Additionally, all alternatives include additional travel lanes in each direction either continuously or intermittently as set forth in the descriptions that follow:

- Modified 2-lane: This alternative was developed out of public input in the scoping meetings. It centers around modifying the existing 2-lane highway by adding turning lanes where needed and occasional passing lanes where possible on alternating sides of the highway in order to enhance the facility's function and capacity. The length should be sufficient to provide passing opportunities in long traffic queues.

  This extra lane would likely be added to alternate sides of the highway (northbound vrs. southbound) from one section to the next and would probably be on the order of 1.6 km (1 mi) or more for efficiency. Locations for the extra lanes were chosen from field determination of areas where they

U.S. Highway 93
HAMILTON TO LOLO
ENVIRONMENTAL IMPACT STATEMENT

FIGURE 2-5
PHOTOS OF TYPICAL "BUILD" ALTERNATIVES

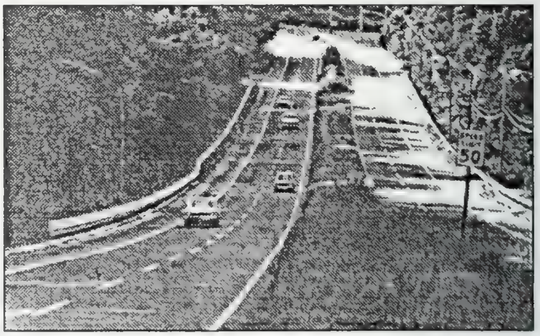
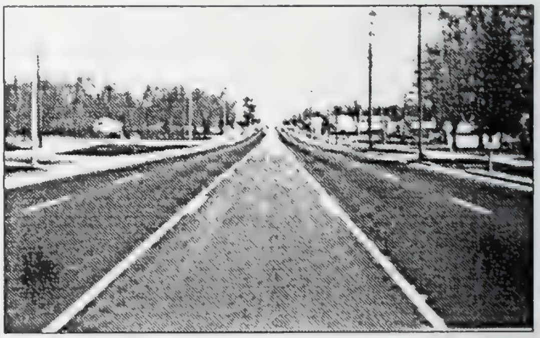
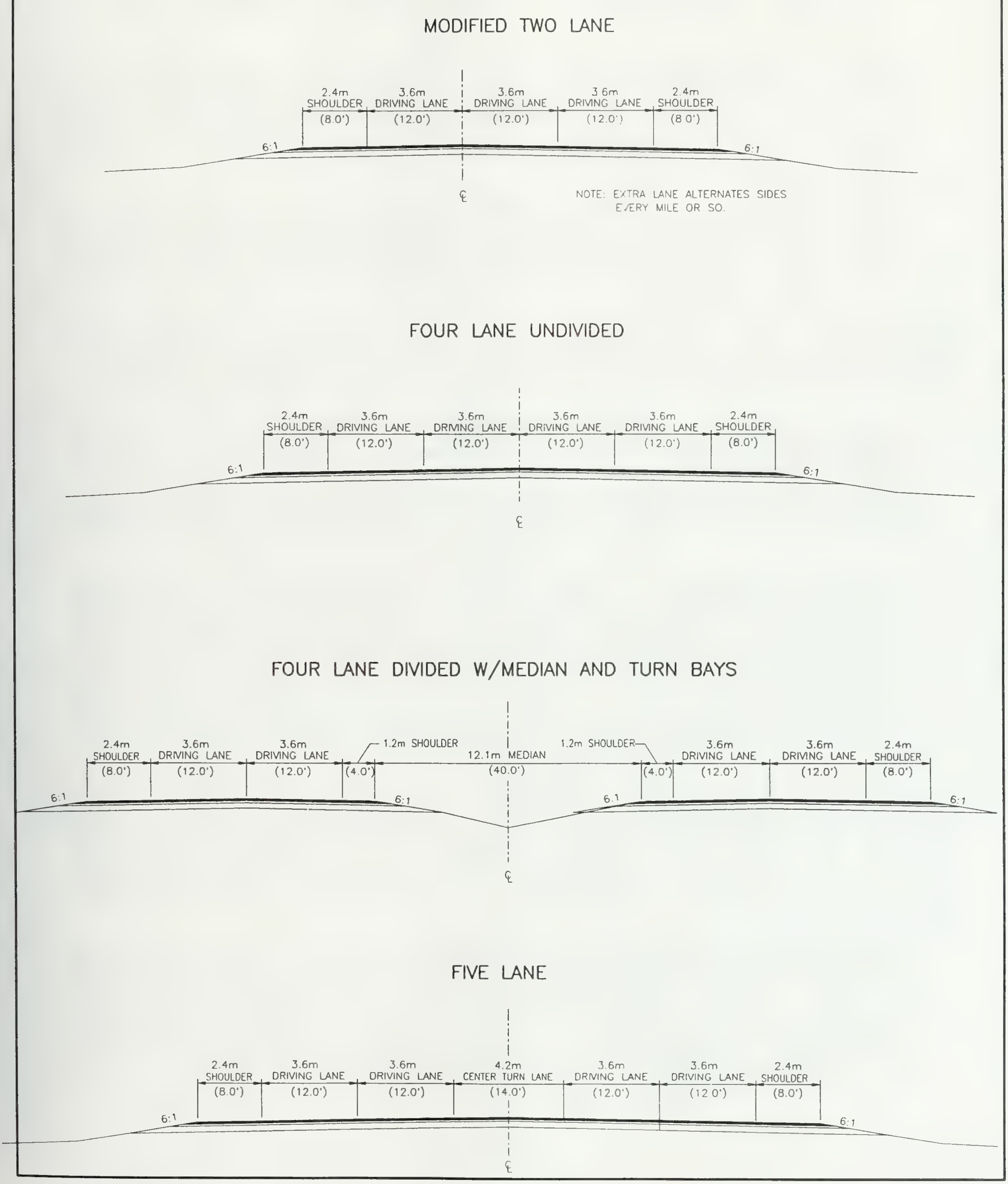
FIGURE	DESCRIPTION	ILLUSTRATION
A	Modified two-lane highway in a rural environment. (Two lanes on one side, single lane on other)	
B	Four-lane undivided highway with full shoulders.	
C	A divided multilane highway in a rural environment.	
D	Five-lane divided highway with center two-way left-turn lane.	

FIGURE 2-6
TYPICAL SECTIONS FOR "BUILD" ALTERNATIVES



could be added with minimal environmental impact. The resulting preliminary design was modeled in the computer along with other alternatives to determine specific impacts.

- 4-lane Undivided: This alternative would incorporate the construction of two continuous lanes of traffic in each direction of travel separated only by a double solid yellow line. Turning lanes or bays would be added at major intersections.

- 4-lane Divided with Median and Turn Bays: This alternative would also incorporate construction of two continuous lanes in each direction of travel, but would be separated by a depressed median. Left hand turning lanes in the median area would be provided at major intersections and right hand turning lanes would also be provided where warranted. Inside shoulders of 1.2 m (4 ft) would be provided in addition to the 2.4 m (8 ft) outside shoulders.

- 5-lane: This alternative would consist of two travel lanes in each direction separated by a continuous two-way center turning lane 4.2 m (14 ft) wide in rural sections and 4.8 m (16 ft) in urban areas. The center turning lane would be striped for left turn only at major intersections. The center turning lane greatly facilitates access to adjacent properties and provides safety for vehicles turning left across traffic into adjacent properties.

Realignment Alternatives: Realignment alternatives were considered where necessary to meet certain local conditions, provide for improved safety, facilitate construction, and/or allow reduction or minimization of environmental impacts. Specific areas where this type of alternative was considered are described below.

- Silver Bridge Realignment: This realignment investigates alternatives for replacing the Silver Bridge over the Bitterroot River just north of Hamilton and eliminating a substandard curve (too sharp) just north of the bridge. A study of alternate alignments was conducted[6], which was later amended at the direction of the Advisory Committee to produce an acceptable alignment with least potential impacts to wetlands and existing buildings and businesses. Figure 2-7 shows the final alignment recommended for the preferred alternative. Depiction of the other routes investigated is given in the study.

- Bass Creek Hill Realignment: The existing highway traverses over the Bass Creek Hill with a steep grade and very close proximity to the Bitterroot River. The river itself is on a northwesterly run at this location, which results in a tendency to cut into the roadway embankment. In conjunction with reducing the grades up and over Bass Creek Hill at this location, a new alignment shifting the roadway generally westerly and parallel to the existing roadway (further away from the river) was considered to reduce potential direct impacts on the Bitterroot River. Figure 2-8 shows the preferred alternative realignment in this area. The reasons for this recommended location are to avoid river impacts, maximize the use of the existing roadway embankment to the best extent possible, and limit the impacts to the adjacent property westward of the existing alignment.

Access Control Policy Alternatives: Alternative access control policies regarding road and driveway access (existing and future) onto Highway 93 were considered on this project in conjunction with the "build" alternatives. The two primary functions of access control are to provide consistency with current land use policy and to enhance safety associated with operation of the highway. Three policies were investigated as described below.

- Restrictive Access Control Policy: As the name implies, restrictive access control eliminates, reduces, or limits the number of accesses allowed to the highway. This would tend to reinforce the effectiveness of any rural land use ordinances which seek to limit new commercial and residential development. As a result, it tends to emphasize concentration of development around existing business areas and residential subdivisions. Generally, this policy is recommended where it is desired to protect existing undeveloped property and also where it is desirable to reduce turning movements on the highway in order to provide improved safety and traffic flow.

FIGURE 2-7
SILVER BRIDGE ALIGNMENT

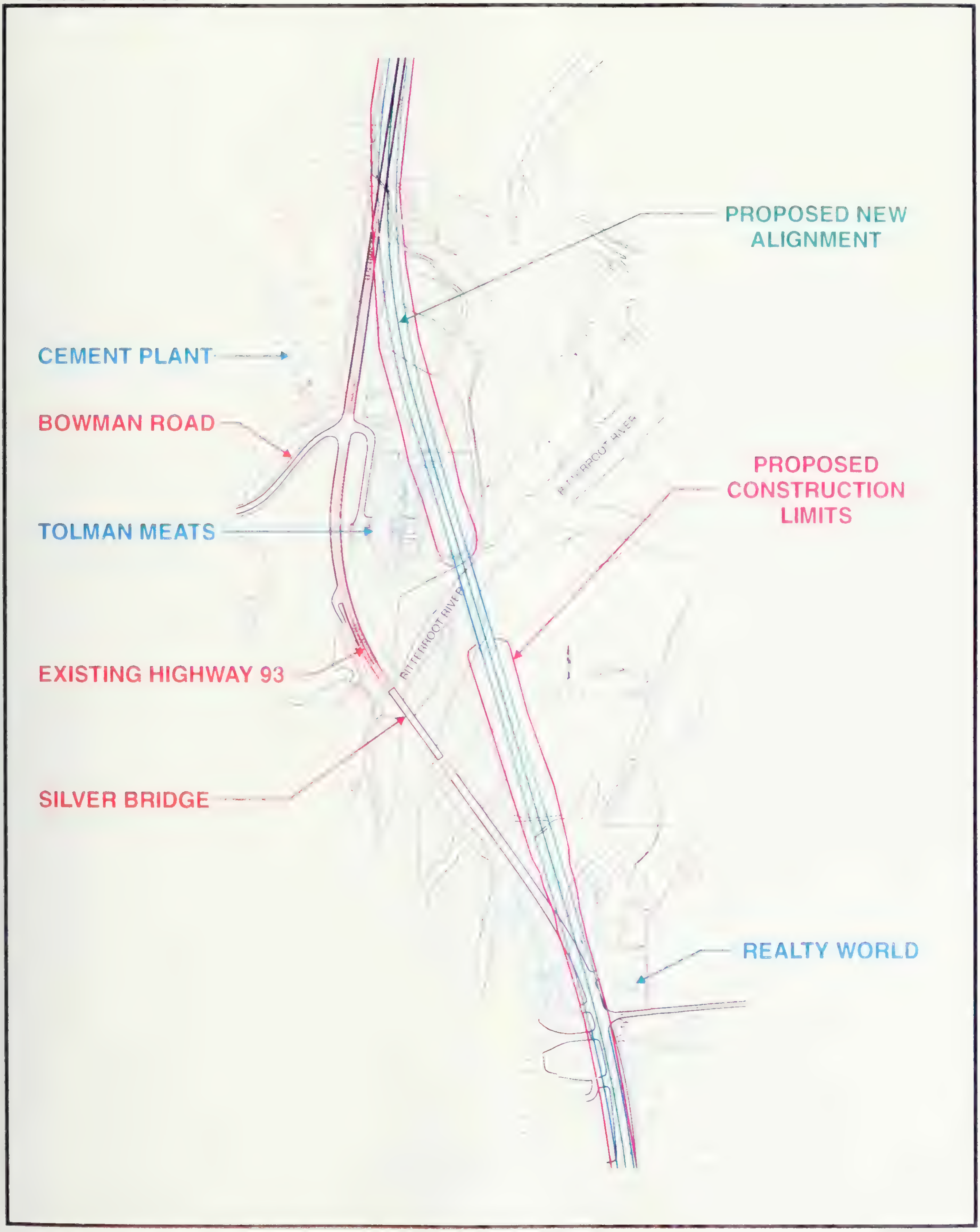
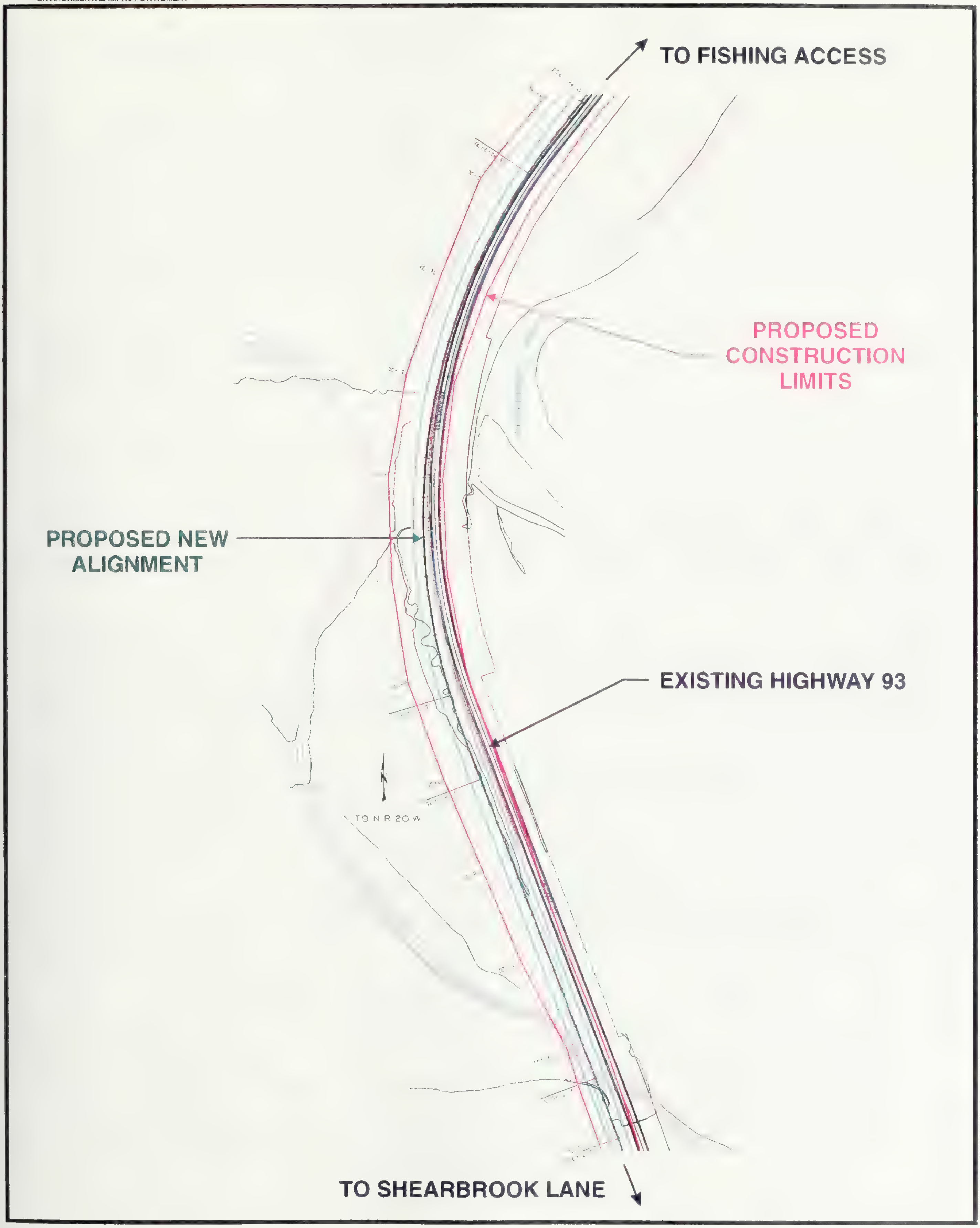


FIGURE 2-8
BASS CREEK HILL ALIGNMENT



- Permissive Access Control Policy: Permissive access control allows the creation or addition of accesses upon review and approval by the controlling authority (MDT). This policy is generally used in areas of existing development where a high degree of access is required and numerous turning movements for vehicles result. This type of control is best suited to maintain existing development or encourage concentration of new growth in already developed areas. It is often associated with "strip growth" due to its lack of restriction to proposed accesses.

- Situational Access Control Policy: This policy allows for a case-by-case review of existing and proposed accesses with regard to highway design, traffic conditions, land use objectives, and other public policy statements. It is generally used or recommended where site-specific circumstances require close coordination to meet land use and safety objectives. For example, an area where heavy development exists on one side of the roadway and virtually none on the other would most certainly require a situational access control in order to maintain the existing land use policies. Another situation might be where low volume accesses for small business could be tolerated, but accesses for a large use such as a shopping center or mall might need to be denied to preserve land use and/or safety at the location.

These alternative policies were not proposed for evaluation by themselves. However, they were considered in conjunction with the "build" alternatives in an effort to achieve the stated functions of being consistent with land use policies and providing for improved traffic safety and operation.

2.6 ESTIMATED COST OF ALTERNATIVES

An economic analysis[7] of the alternatives was conducted to examine the costs of design, construction, implementation, and operation and maintenance of each alternative. Additionally, the study looked at a comparison of costs for the alternatives based on their present worth, their average cost per user, and the incremental benefit-to-cost ratio. The following information summarizes and highlights the results of that study.

Capital Costs: These are the actual costs generally associated with construction, including equipment, materials, construction, right-of-way acquisition, legal assistance, design engineering, and construction management. Construction costs were estimated by completing an actual preliminary design for each alternative to determine earthwork, pavement thicknesses, bridges, culverts, signing, and other miscellaneous items necessary to properly construct improvements.

For the "no build" alternatives the capital costs include expenses required to purchase equipment and upgrade facilities to accommodate the alternative (e.g., railline work for the passenger rail service). Table 2-2 presents the capital costs estimated for each of the alternatives.

TABLE 2-2
ESTIMATED CAPITAL COSTS FOR ALTERNATIVES

Alternative	Total Estimated Cost (millions)
"No Build" Alternatives	
No Action	$ 0.0
Park-and-Ride	0.5
Commuter Bus Service	0.4
Passenger Rail Service (Regular Cars)	48.0
Passenger Rail Service (Self-Contained Cars)	49.2
"Build" Alternatives	
Modified 2-Lane	26.0
4-Lane Undivided	31.3
4-Lane Divided w/Median & Turn Bays	39.6
5-Lane	37.7
Preferred Alternative	33.9

The capital costs assume inclusion of reasonable amenities, following the recommended realignments, and providing for the recommended access control.

Operation and Maintenance Costs: These are the annual costs incurred over the life of the project (taken as 20 years) in order to operate the facility and maintain the alternative in an acceptable condition. The operation and maintenance costs for the "no build" alternatives were taken from reports prepared by experts familiar with the operation of such alternatives. Highway operational costs were taken from MDT's current experience for similar facilities. Any user fees to be imposed were not included in the analysis in order to provide a true comparison.

Table 2-3 gives the estimated operation and maintenance costs for the alternatives.

**TABLE 2-3
ESTIMATED ANNUAL
OPERATION AND MAINTENANCE COSTS FOR ALTERNATIVES**

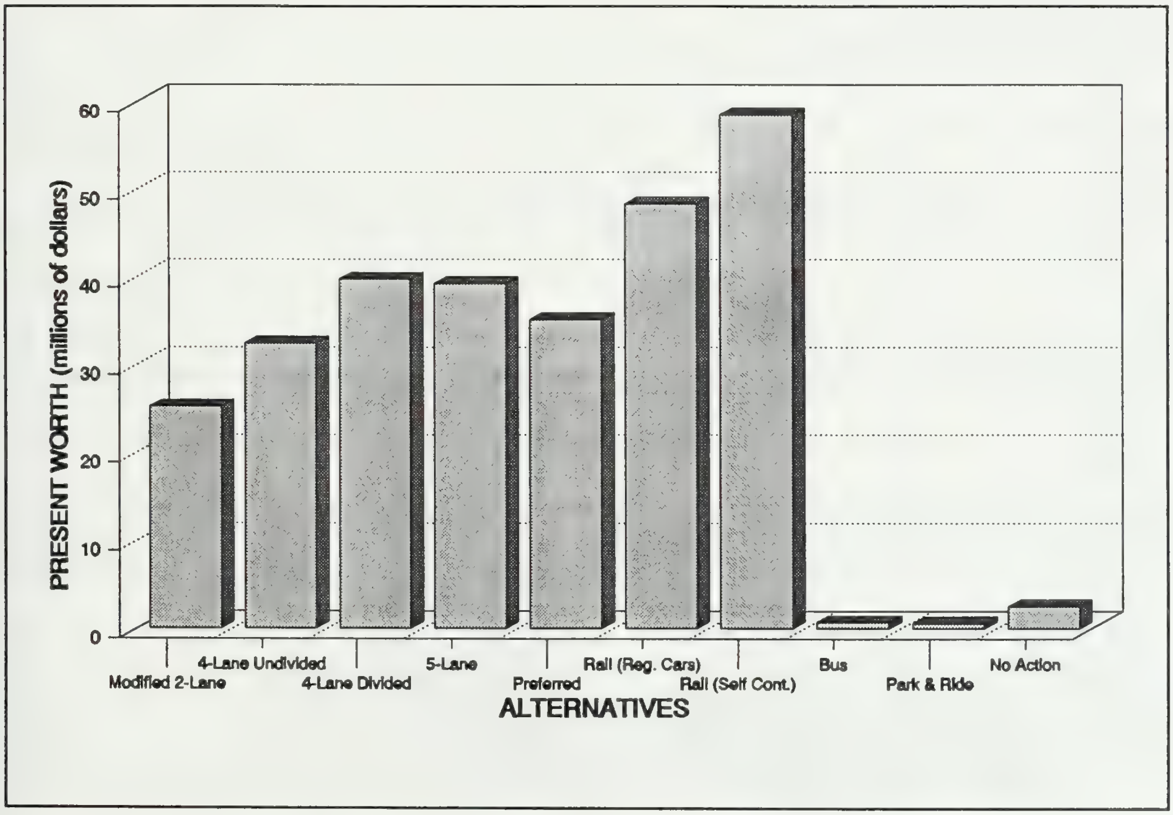
Alternative	Estimated Annual Cost (millions)
"No Build" Alternatives	
No Action	$ 0.19
Park-and-Ride	0.06
Commuter Bus Service	0.05
Passenger Rail Service (Regular Cars)	0.56
Passenger Rail Service (Self-Contained Cars)	1.24
"Build" Alternatives	
Modified 2-Lane	0.28
4-Lane Undivided	0.37
4-Lane Divided w/Median & Turn Bays	0.37
5-Lane	0.46
Preferred Alternative	0.41

Present Worth Analysis: As some alternatives are less costly to construct but considerably more expensive to maintain and vice-versa, it is necessary to use a method considering both the initial construction costs and the operation and maintenance costs over the life of the facility to provide a true comparison. The present worth method does this by bringing both costs back to a number representing the amount of money that would need to be invested now in order to both construct the facility and operate and maintain it over its design life.

For the purposes of this analysis, the design life was taken at 20 years and the annual interest rate (1995), commensurate with federal guidelines, was taken at 4%. The present worth analysis also takes into account that at the end of 20 years some facilities have remaining salvage value (additional useful life) or equipment value if sold on the open market, which is also factored in to give a true picture of the value of the investment. Table 2-4 compares the alternatives on the basis of estimated present worth. Figure 2-9 graphically summarizes the results of the table.

TABLE 2-4 ESTIMATED PRESENT WORTH FOR ALTERNATIVES	
Alternative	**Total Estimated Cost (millions)**
"No Build" Alternatives	
No Action	$ 2.5
Park-and-Ride	0.6
Commuter Bus Service	0.7
Passenger Rail Service (Regular Cars)	48.3
Passenger Rail Service (Self-Contained Cars)	58.5
"Build" Alternatives	
Modified 2-Lane	25.2
4-Lane Undivided	32.4
4-Lane Divided w/Median & Turn Bays	39.7
5-Lane	39.2
Preferred Alternative	35.1

FIGURE 2-9
PRESENT WORTH COMPARISON OF ALTERNATIVES



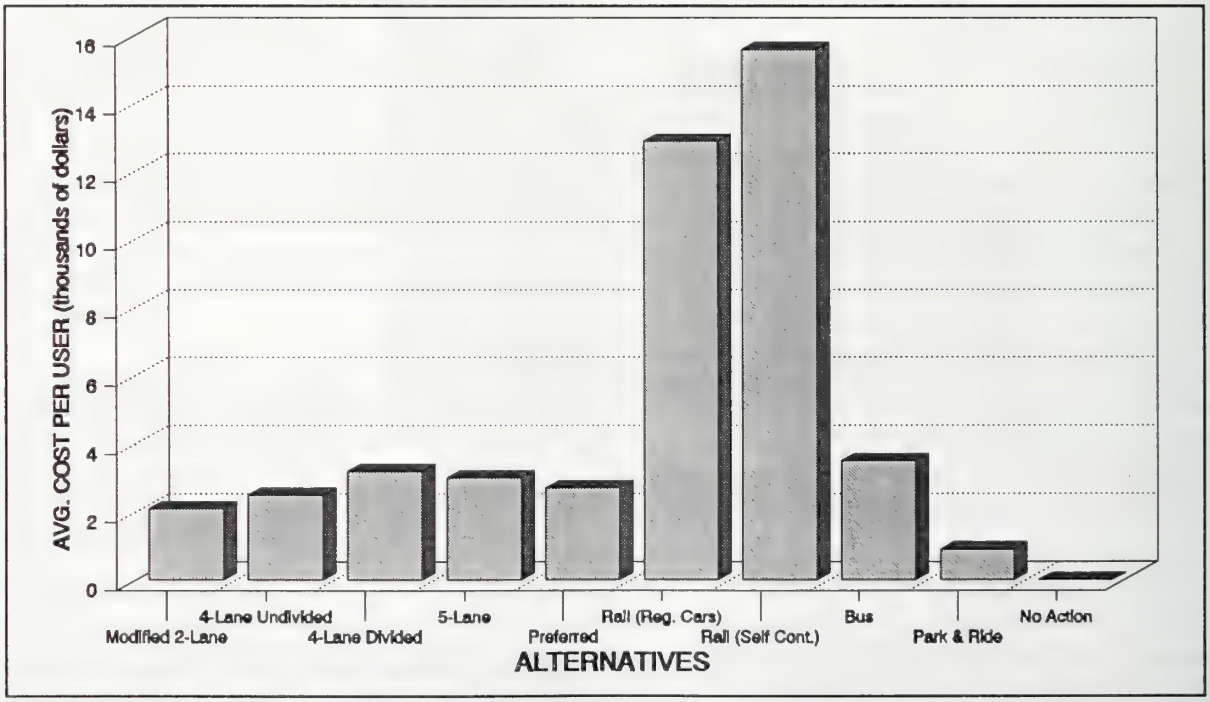
Average Cost Per User: Although the present worth method compares alternatives in terms of financial value, it considers only associated costs and not the relative benefits. In order to consider the benefits, other methods such as the average cost per user and cost-to-benefit ratio methods are used. The average cost per user method allows for a rapid, uncomplicated comparison of all alternatives by comparing the cost of providing the improvement to the number of people who are expected to directly benefit from that cost.

Projected highway usage was used to estimate the number of persons benefiting from "build" alternatives and estimated usage of the "no build" alternatives was derived from the TDM study[5] and public surveys. Table 2-5 and Figure 2-10 show the results of this comparison.

TABLE 2-5
ESTIMATED AVERAGE COST PER USER FOR ALTERNATIVES

Alternative	Total Cost (thousands)
No Build Alternatives	
No Action	$ 0.0
Park-and-Ride	0.9
Commuter Bus Service	3.5
Passenger Rail Service (Regular Cars)	12.9
Passenger Rail Service (Self-Contained Cars)	15.6
Construction Alternatives	
Modified 2-Lane	2.1
4-Lane Undivided	2.5
4-Lane Divided w/Median & Turn Bays	3.2
5-Lane	3.0
Preferred Alternative	2.7

FIGURE 2-10
AVERAGE COST PER USER COMPARISON OF ALTERNATIVES



2.7 PREFERRED ALTERNATIVE

This section sets forth a general description of the preferred alternative recommended for implementation to improve transportation within the Hamilton to Lolo corridor. It is again emphasized the final selection and approval of the preferred alternative recommendations will not be made until this environmental document, containing information about the alternatives and their impacts, has been presented to regulatory agencies and at formal public hearings and the comments resulting therefrom are fully evaluated.

The preferred alternative is in reality a combination of elements of several alternatives set forth in this document. These elements were recommended for their ability to economically meet the stated purposes and needs for transportation improvements in the corridor while offering the opportunity to minimize impacts. As such it is also the environmentally preferred plan. Elements of the preferred alternative include:

- construction of park-and-ride lots and implementation of park-and-ride system
- establishment of a transportation management association (TMA) to manage the park-and-ride system and promote traffic reduction measures
- construction of 4-lane, undivided highway in undeveloped (rural) areas of the corridor
- construction of 5-lane highway (4-lanes with center turning lane) in "urban" areas of the corridor
- minor realignment of the highway at Silver Bridge and Bass Creek Hill
- implementation of access control policies to enhance the function of the recommended construction alternatives and preserve land uses
- construction of auxiliary lanes (turning, acceleration, and deceleration)
- construction of pedestrian and bicycle facilities
- installation of traffic signals on US 93 at MT 203 (Eastside Highway) in Florence and at MT 373 (Woodside Crossing) in Woodside
- provision for curb, gutter, and drainage facilities where appropriate

Appendix A of this environmental document contains an overlay of the construction elements of the preferred alternative on an aerial photo background, along with delineation of the construction limits and probable right-of-way. Depiction of the other "build" alternatives would show similar results.

General Considerations for Recommendation: The primary consideration for recommendation of any alternative or elements of alternatives to combine together is the ability to meet the stated purposes and needs for improving transportation, as have been set forth in Chapter 1. The next important consideration is the ability to avoid negative impacts. In order to accomplish this, consideration should be given to implementing the "no build" alternatives, utilizing the established corridor, and following the existing alignment wherever possible.

Negative impacts should be avoided if possible. If impacts cannot be avoided, then consideration must be given to minimizing the impacts that are created by implementation of any proposed action. Generally, this would suggest recommending alternatives that would utilize existing facilities to the greatest extent possible, minimize the area required for disturbance during construction, and those that would closely match existing conditions such as current land use and prevailing development patterns.

Cost is also a major consideration is recommending alternatives for implementation. The proposal must be affordable on a first cost basis and reasonable in terms of long-term commitment for operation and maintenance. Feasibility and practicality are also related concerns; will the facilities be fully utilized?, are the benefits to be derived reasonably proportional to the costs?, and will the solutions be acceptable to and supported by the public?

Lastly, an examination of the specific impacts associated with various alternatives in different locations within the project corridor should identify those actions most conducive to solving problems while minimizing the creation of additional impacts. This includes not only immediate impacts but also long-term, secondary, or cumulative effects associated with implementing the various alternative actions.

Elements of the Preferred Alternative: This section describes the elements of the preferred alternative that have been recommended for implementation with respect to the general considerations just described and the specific impacts enumerated later in this environmental document.

- Park-and-Ride System: By itself the park-and-ride system does not provide for improving conditions of the existing roadway nor providing sufficient increase in capacity to meet the recommended level of service. However, the transportation demand management study[5] predicts a maximum of approximately 5% of the existing highway users would use park-and-ride facilities if available.

  Although traffic reduction from these facilities would be fairly insignificant to the overall problem, the park-and-ride alternative does represent a cost effective way to introduce transportation demand management to the Bitterroot Valley. For a relatively small commitment of capital as compared to commuter bus service or a passenger rail service, the park-and-ride system offers an excellent opportunity for local residents to begin doing something about the problem that over 80% of the vehicles on the highway have only one occupant.

  The recommended locations for the park-and-ride would generally be as depicted in Figure 2-4 and as called out in Table 2-6; Hamilton, Woodside, Victor, Stevensville Y-Intersection, Florence, and Lolo. Approximately 10 hectares (25 acres) of parking lot would be divided up among the six parking lot locations.

  An additional recommendation related to this element is the establishment of a Transportation Management Association (TMA). Efforts are already underway to organize and fund a local organization to establish rideshare programs, provide public education programs on traffic reduction, and establish the administrative and coordination support necessary to organize and expand the entire program as it becomes established and begins to grow. Additional functions of the TMA would be to take responsibility for operation and administration of the park-and-ride facilities and provide for the implementation of other traffic reduction measures that may arise as an outgrowth of these efforts to encourage the public to consider traffic reduction measures.

- 4-Lane Undivided Highway: This alternative is the most economical way to upgrade the existing 2-lane highway to a higher capacity and the recommended level of service. This will also allow minimization of construction costs among the 4-lane alternatives due to it being the narrowest section. Similarly, environmental impacts (particularly those to wetlands and need for additional right-of-way) are reduced corresponding to the narrower section. The typical section for this alternative was shown in Figure 2-6.

  According to AASHTO guidelines[8] this alternative is relatively safe when used in conjunction with restrictive access control policies (discussed later in this Chapter). Therefore, this alternative is preferred only in rural areas void of extensive development where restrictive access control policies can be implemented. For additional safety, main intersections would have turning and/or acceleration lanes and a 2.4 m (8 ft) shoulder would be provided wherever this alternative is called for.

Specific locations for use of this alternative are summarized in the tables in the subsection hereafter entitled *Summary of Recommendations for Preferred Alternative*. However, in general this alternative will be used in rural areas between developed communities due to its economy and minimization of impacts. The combination of this alternative with a restrictive access control policy helps to discourage "strip growth" in these undeveloped rural areas and also reduces the number of intersections and accesses; thereby increasing safety and capacity.

- <u>5-Lane Highway</u>: This alternative provides two travel lanes in each direction separated by a continuous center turning lane. This alternative is recommended for use in developed areas with numerous street and driveway accesses and where it is impractical to limit left turns. The typical section for this alternative was shown on Figure 2-6.

  This alternative is generally used in conjunction with a permissive access control policy. Therefore, it should not be considered for use in rural or other areas where "strip growth" is undesirable. Specific locations are listed in the tables in summary section hereafter, but the general locations are Woodside, Victor, Stevensville Y-Intersection, Florence, and Lolo areas. Strip growth development patterns already exist in these areas with a relatively high number (12 to 19) of approaches per kilometer (20 to 30 per mile). It is impractical to limit left turns in these areas and the construction of frontage roads is not practical without creating major business disruption or displacement.

  It is recommended to include curb and gutter in the most heavily developed areas in order to define accesses and improve drainage. The higher degree of access afforded by this alternative encourages further development (densification) of the area, which goal is consistent with land use planning policies of the local governments. This alternative is recommended to extend beyond the existing development areas for a short distance in order to provide for and accommodate anticipated additional growth.

- <u>Realignment Areas</u>: Two areas requiring new alignment to meet current design standards are the Silver Bridge crossing of the Bitterroot River north of Hamilton and the Bass Creek Hill area. Figures 2-7 and 2-8 illustrated these proposed realignments, respectively.

  In addition to providing an improved alignment, the realignment at Silver Bridge will allow for replacing the existing deteriorated and substandard width structure without having to close the existing highway during construction, provide for major detouring, or require an expensive temporary structure. There is also a need to provide improved hydraulic characteristics in the river itself, which a new bridge crossing could provide. Of several realignment possibilities studied in this area[6] the one recommended for implementation (as shown herein) allows for meeting the objectives while minimizing impacts to the river, wetland areas, and adjacent businesses.

  Realignment in the Bass Creek Hill area was considered to improve the substandard vertical alignment and grades, eliminate guardrail, and shift the existing highway facilities away from the Bitterroot River where negative impacts are already occurring.

- <u>Access Control Policies</u>: Specific implementation of the three types of access control policies (restrictive, permissive, and situational) is recommended in conjunction with the construction alternatives to help promote the objectives of County land use policies, enhance the safety of the facility, and improve its efficiency. Specific locations for application of these policies are given in the tables of the summary subsection hereafter. The following paragraphs describe in general terms where and why these policies would be implemented.

  - *Restrictive Access Control* discourages development of commercial and residential land in presently undeveloped areas. Use of this policy in existing rural portions of the corridor restricts new road or driveway accesses onto Highway 93, tending to discourage new development because of the difficulty it would have in directly accessing the highway. This discouragement also

tends to encourage concentration of development around the existing business areas and residential subdivisions due to their easier access. The resulting higher concentration provides more efficiency for land use and tends to preserve undeveloped lands for agricultural, wildlife, and other similar "undeveloped" uses. Predominately, this policy is recommended for use in conjunction with the undivided 4-lane highway to provide these conditions and maximize safety, efficiency, and capacity.

- *Permissive Access Control* allows greater flexibility in locating new or additional residential, commercial, and industrial accesses to the highway. It is best suited to maintain existing development patterns and encourage "concentration" of new growth in already developed areas. For this reason, it is recommended for use in conjunction with the 5-lane alternative, since both are especially suited for areas where a high degree of access is required. Conversely, permissive access control should not be used in undeveloped areas since the greater degree of access afforded could become a catalyst for the development of "strip growth".

- *Situational Access Control* is suited for areas where flexibility is needed to enact either restrictive or permissive access control policies based on highway design, traffic conditions, land use patterns, and other public policy objectives. In particular, this policy works well for an area where a "case by case" review of proposed accesses would provide maximum compatibility for meeting the local land use objectives or where access control needs vary within a short distance (i.e. one side of the highway to the other).

  An example on this project is the Stevensville Y-Intersection and the consideration of accesses on the undeveloped (east) side of the highway. A situational access control policy could allow for a number of low volume accesses to be constructed while denying large volume accesses (e.g., shopping center) that would have a substantial negative effect on local traffic flow and capacity.

- <u>Auxiliary Lanes</u>: Auxiliary lanes are an amenity that provides for greater safety and improved traffic flow. As a minimum, existing turning and acceleration lanes should be perpetuated and left turning bays should be provided at all County road intersections. It is recommended to use auxiliary lanes at major intersections throughout the project to provide an adequate level of service. Specific recommendations for locating auxiliary lanes are shown in the summary subsection hereafter.

- <u>Traffic Signals</u>: Warrants for installation of traffic signals to improve traffic flow and safety have been investigated at all major intersections in the corridor. Currently conditions warrant the installation of traffic signals at MT 373 (Woodside Crossing) in Woodside and at MT 203 (Eastside Highway) in Florence. The primary function of the signals is to allow safe turning movements to and from US 93 for traffic on the intersecting facility. It is recommended the signals be "loop" controlled so they cycle only when there is enough of a delay for turning or side road traffic to warrant stopping the traffic flow on US 93.

- <u>Pedestrian and Bicycle Facilities</u>: These facilities should be added to those areas where new construction is called for. Specifically, providing 2.4 m (8 ft) shoulders throughout the project should be maintained on both sides of the highway and at all bridge crossings. In those areas where curb and gutter is constructed in the "urban" segments of the corridor, 1.6 m (5 ft) sidewalks should be constructed behind the curb and gutter.

  Currently, bicycle facilities in the Bitterroot Valley are fairly limited. The shoulders of the existing highway are very narrow and few separate bike paths exist. In recognition of the intermodal emphasis envisioned in ISTEA, it is recommended to accommodate bicycles throughout the corridor. In most cases the 2.4 m (8 ft) shoulders will provide for this if they are also extended across structures and the rumble strips next to the traveled lane are shortened to provide a smooth area on the outside of the shoulder for bicyclists.

A separate bike path is recommended at the north end of the project due to the greater anticipated number of bicyclists who are within practical commuting distance of Missoula. This path could be constructed within the right-of-way at the toe of fill and cutslopes or possibly could be constructed on portions of the abandoned railroad grade in the Victor to Florence segment in conjunction with the program for converting "rails to trails" presently being encouraged by the enhancement program.

- Curb, Gutter, and Drainage: Curb and gutter sections are recommended in high density developed areas in order to help define and organize approaches to the highway to meet safety standards. Since drainage is also often a problem where multiple approaches exist, the curb and gutter system should provide for drainage into a separate storm drain system.

Reasons for Recommending Preferred Alternative Elements: The predominant reason for recommending the indicated elements of the preferred alternative was to meet the stated purposes and needs for improving transportation in the corridor. In particular, the abilities of the elements to provide for increased capacity, improve safety, and provide greater efficiency were important considerations.

In comparison to other alternatives they offered lower cost, higher feasibility, and greater practicality in obtaining the objectives. In most cases, they also provided elimination or a minimization of impacts as well as consistency with local government objectives. Lastly, they are consistent with public consensus built through the public involvement process and are supported by the recommendations of the Citizen's Advisory Committee and Interdisciplinary Team.

Summary of Recommendations for Preferred Alternative: The following tables summarize the specific locations of the various elements proposed for the preferred alternative. The tables are arranged to follow the organization of alternatives as described earlier in this Chapter and to provide comparison of the preferred alternative to the others considered.

TABLE 2-6
RECOMMENDATIONS FOR "NO BUILD" ALTERNATIVES

Milepost	"No Action"	Park & Ride	Commuter Bus	Passenger Rail	Description
49.2		X			Hamilton, 2.5 h (6.2 ac)
51.9		X			Woodside, 1.0 h (2.5 ac)
59.4		X			Victor, 1.0 h (2.5 ac)
66.7		X			Stevensville Y-Intersection, 1.0 h (2.5 ac)
74.7		X			Florence, 2.0 h (5.0 ac)
84.2		X			Lolo, 2.5 h (6.2 ac)

TABLE 2-7
SUMMARY OF RECOMMENDATIONS FOR "BUILD" ALTERNATIVES & ACCESS CONTROL POLICIES

Location (milepost)		"Build" Alternative (miles)				Access Control Policy	Description
From	To	Modified 2-lane	4-lane Undivided	4-lane Divided	5-lane		
49.0	49.4				0.4	Permissive	Hamilton Area
49.4	50.1		0.7			Restrictive	Silver Bridge
50.1	51.7				1.6	Situational	
51.7	53.4				1.7	Permissive	Woodside Area
53.4	53.9		0.5			Restrictive	
53.9	54.6				0.7	Permissive	Sheafman Creek Road
54.6	55.9		1.3			Restrictive	
55.9	56.7				0.8	Permissive	
56.7	57.3		0.6			Restrictive	
57.3	58.8				1.5	Situational	
58.8	59.7				0.9	Permissive	Victor Area
59.7	60.2		0.5			Situational	
60.2	60.6				0.4	Permissive	Log Home Plant
60.6	61.0		0.4			Restrictive	
61.0	61.5				0.5	Permissive	Bell Crossing Area
61.5	64.9		3.4			Restrictive	
64.9	67.9				3.0	Situational	Stevensville "Y" Area
67.9	73.0		5.1			Restrictive	
73.0	75.1				2.1	Permissive	Florence Area
75.1	82.3		7.2			Restrictive	
82.3	83.2				0.9	Permissive	Lolo Area
TOTAL MILES		0.0	19.7	0.0	14.5		

TABLE 2-8
RECOMMENDATIONS FOR ALIGNMENT ALTERNATIVES

Milepost		Follow Existing	Realignment	Description
From	To			
49.0	49.9		X	Silver Bridge
49.9	68.8	X		
68.8	69.8		X	Bass Creek Hill
69.8	83.2	X		

TABLE 2-9
RECOMMENDATIONS FOR AUXILIARY LANES

Milepost	Direction	Turning Lanes		Acceleration Lanes	Description
		LT Turn Lane	RT Turn Lane		
49.7	NB	X			Bowman Road
	SB		X		
52.0	NB	X	X	X	FAS 373 at Woodside
	SB	X	X	X	
54.0	NB	X			Sheafman Creek Road
	SB		X		
56.0	NB	X			Bear Creek Road
	SB		X		
57.8	NB	X			Meridian Road
	SB		X		
59.0	NB	X	X		Third Street in Victor
	SB	X	X		
59.2	NB	X			Main Street Victor
	SB	X			
61.1	NB		X	X	FAS 370 North of Victor (Bell Crossing)
	SB	X			
63.1	NB	X			Indian Prairie Loop
	SB				
63.6	NB	X			Garnett Drive
	SB				
63.9	NB	X			Paso Drive
	SB				
64.3	NB	X			County Road (McCalla Creek)
	SB				
66.7	NB		X	X	Eastside Highway (Stevensville Y-Intersection)
	SB	X			
67.2	NB	X			Kootenai Creek Road
	SB				
68.8	NB	X			Schearbrook Lane
	SB				
70.4	NB	X			Bass Creek Road
	SB		X		
71.9	NB		X		Hoblitt Lane
	SB		X		
73.0	NB	X	X		Sweeney Creek Road
	SB	X	X		
74.7	NB	X	X	X	Eastside Highway at Florence
	SB	X	X		
75.0	NB	X			Old Highway 93
	SB		X		
75.3	NB				Long Lane
	SB		X		

TABLE 2-9
RECOMMENDATIONS FOR AUXILIARY LANES

Milepost	Direction	Turning Lanes		Acceleration Lanes	Description
		LT Turn Lane	RT Turn Lane		
76.8	NB	X			Chief Looking Glass Road
	SB	X			
77.8	NB	X			Carlton Creek Road
	SB	X			
80.8	NB	X			Old Highway 93
	SB		X		
81.4	NB	X			Maclay Road
	SB				
82.7	NB	X			Mormon Creek Road
	SB		X		

NB = Northbound SB = Southbound LT = Left RT = Right

TABLE 2-10
RECOMMENDED AMENITIES

Milepost		Pedestrian/Bike Path			Traffic Signals	Signing & Pavement Marking	Lighting	Curb & Gutter
From	To	Shoulder	Separate	Sidewalk				
49.0	49.4			X		X	X	X
49.4	51.9	X				X		
51.9	52.4	X			X	X	X	X
52.4	59.0	X				X		
59.0	59.4			X		X	X	X
59.4	61.0	X				X		
61.0	61.1	X				X	X	
61.1	66.7	X				X		
66.7	66.8	X				X	X	
66.8	74.1	X			X	X		
74.1	75.0			X		X	X	X
75.0	80.8	X				X		
80.8	82.9		X			X		
82.9	83.2		X	X		X	X	X

2.8 ANALYSIS OF ALTERNATIVES

This section describes the approach taken to analyze the various alternatives carried forward for further examination with regard to potential impacts. Chapter 3.0 describes the present environmental setting and Chapter 4.0 identifies specific impacts of each of the alternatives on that environmental setting, including future conditions. The analysis of the alternatives performed in this environmental study provided the basis

and necessary information to evaluate the alternatives with respect to one another as described in the next section.

Environmental Studies: Separate individual impact studies were conducted for all major areas of anticipated environmental impacts. This includes specific categories with regard to the physical, biological, and human environments. Appendix B contains a listing of the separate environmental studies performed. Examples of typical studies include Air and Noise Quality Study; Hazardous Materials Assessment; Wetlands Evaluation; Biological Assessment; Farmland Study; Economic Study; and Cultural/Historical Resources Inventory.

The studies provided valuable information needed to analyze alternatives; helping first to identify the impacts that occur and secondly to differentiate those impacts between alternatives. Each of the alternatives carried forward in this environmental document were specifically investigated in the studies performed. The majority of this EIS is a summary of the highlights, conclusions, and recommendations from the individual studies.

Agency Coordination: Coordination was made with numerous State and Federal agencies as reviewed elsewhere in this document. The coordination included discussing the results of the studies described above, along with reviewing the relative advantages and disadvantages of the various alternatives with regard to specific environmental impacts. Intense coordination was also held with the Interdisciplinary Team (specific representatives of various interested agencies), the Citizen's Advisory Committee (representing groups of citizens from the general public), and with the public in public meetings (speaking individually for themselves). Feedback and input from all these sources was added to the results of the reports and studies to assist in more thoroughly analyzing the alternatives with regard to specific topics.

National Standards: Another important source of information to help analyze alternatives are standards, guidelines, specifications, and experience developed on a national or state basis by agencies or certain groups having specific expertise. For example, the American Association of State Highway and Transportation Officials (AASHTO) recommends specification standards and policies on a national scale that every State has adopted with regard to design and operation of highway systems. Congressional and executive office directives from the US Government are another important source of standards and policies to help analyze alternatives with regard to environmental impacts.

Lastly, there are numerous publications which review experience gained nationwide on specific topics that help greatly in identifying potential impacts and their anticipated degree of impact for various proposed actions.

Engineering Design: A preliminary engineering design was developed for <u>all</u> alternatives requiring some manner of construction. This included developing preliminary designs for all "build" alternatives, and looking at the requirements for park-and-ride and passenger rail facilities. Such information was primarily used to quantify the amount of impacts associated with the individual alternatives and estimate quantities, cost, and other needs that would be required to implement a given alternative.

A three dimensional computer model of the entire 55.1 km (34.2 mi) corridor was created to represent existing conditions. Models of each of the alternatives requiring construction were also created to be overlaid on the existing conditions. For example, a preliminary design of a 4-lane undivided highway was created, which determined the necessary alignment and grade for proper design. When this model was superimposed on the existing conditions, the computer was able to identify the extent of construction limits and the quantities needed for constructing the alternative which formed the basis for estimating its cost. Once the construction limits were defined, they were overlaid on computer maps of existing wetlands, floodplains, and other similar areas that allowed actual computation of areas to be disturbed and impacts to be expected. A similar process was undertaken for <u>each</u> alternative requiring some construction.

Initially, computer models were assembled using existing alignment and grade throughout the corridor. Intuitively it was felt that doing so would likely yield the least amount of impacts. After the initial analysis of

impacts was determined and presented, the Interdisciplinary Team and Citizens Advisory Committee suggested the impacts may be considered excessive in certain areas and recommended further engineering efforts to seek ways of reducing those impacts. One concern singled out for special re-evaluation was the effect on wetland areas within the project corridor.

A long period of further preliminary design engineering ensued, which critically examined possible minor adjustments to line and grade that would allow avoidance or minimization of impacts. This was done by identifying areas of greatest impact and looking closely for minor alignment shifts and grade changes in the local area that would provide for a reduction of impacts for each alternative. Needed alignment shifts were quite minor, generally about the width of the existing road (9 m [30 ft]) or less. Grade changes of 1 m (3.3 ft) or less also helped avoid impacts depending on the width of the alternative being studied. Since these adjustments would leave the alternative predominantly within existing right-of-way limits, they were considered reasonable and practicable and the results therefrom were carried forward into the analyses presented in this document.

Although this significant additional engineering effort required a great deal of time, it reduced expected impacts on <u>all</u> alternatives for nearly every environmental concern in comparison to the initial engineering on existing alignment and grade. It also indicates even further impact reduction may be achieved during detailed design when and if construction alternatives are approved for implementation.

2.9 EVALUATION OF ALTERNATIVES

Chapter 4.0 presents impacts associated with various areas of environmental concern for each of the alternatives. Project personnel, the Interdisciplinary Team, the Advisory Committee, and the general public all evaluated the results of the analyses to try and come up with recommendations for improvement.

To facilitate review and evaluation of the various alternatives with regard to expected environmental impacts and fulfillment of the stated purposes and needs for improvement, the following tabulated information is offered. After the tables is a section evaluating transportation demand management measures (means to reduce traffic on the highway and demand for use of the facility) is presented as it helps in identifying those measures with the greatest chance for success in the Bitterroot Valley. The information is presented in this chapter on alternatives since it does not really fit with affected environment or environmental consequences.

Purpose and Need: The purpose and need for the proposed action were presented and discussed in Chapter 1.0. Table 2-11 provides an at-a-glance comparison among the alternatives for their relative ability to meet the purposes and needs.

Evaluation of Environmental Impacts: Table 2-12 presents a summary evaluation of the alternatives with respect to various environmental categories. This table discusses some specifics where Table 4-19 provides more of a "rating" type comparison among alternatives.

TABLE 2-11
EVALUATION OF MEETING PURPOSE AND NEED

Purpose and Need	ALTERNATIVE									
	No Action	Park-&-Ride	Commuter Bus	Passenger Rail	Modified 2-Lane	4-Lane Undivided	4-Lane Divided	5-Lane	Alternate Alignments	Preferred Alternative
System Linkage	• Provides linkage but at reduced efficiency due to congestion and inadequate capacity. • Function as primary arterial inhibited. • Conditions substandard to NHS recommendations.	• Provides linkage but at reduced efficiency due to congestion and inadequate capacity. • Function as primary arterial inhibited. • Conditions substandard to NHS recommendations.	• Provides linkage but at reduced efficiency due to congestion and inadequate capacity. • Function as primary arterial inhibited. • Conditions substandard to NHS recommendations.	• Provides linkage but at reduced efficiency due to congestion and inadequate capacity. • Function as primary arterial inhibited. • Conditions substandard to NHS recommendations.	• Provides linkage but at reduced capacity. • Function as primary arterial somewhat diminished. • Some improvements to NHS standards	• Provides linkage with adequate capacity. • Function as primary arterial enhanced. • NHS standards met • System continuity improved.	• Provides linkage with adequate capacity. • Function as primary arterial enhanced. • NHS standards met • System continuity improved.	• Provides linkage with adequate capacity. • Function as primary arterial enhanced. • NHS standards met • System continuity improved.	• No significant impact.	• Provides linkage with adequate capacity. • Function as primary arterial enhanced. • NHS standards met • System continuity improved.
Area Growth	• Inadequate present capacity. • Inhibited function. • No growth potential.	• Inadequate present capacity. • Reduced function. • Limited growth potential.	• Inadequate present capacity. • Reduced function. • Limited growth potential.	• Inadequate present capacity. • Reduced function. • Limited growth potential.	• Moderate capacity improvement. • Improved function. • Some growth potential.	• Adequate present capacity. • Enhanced function. • Future growth potential.	• Adequate present capacity. • Enhanced function. • Future growth potential.	• Adequate present capacity. • Enhanced function. • Future growth potential.	• No significant impact.	• Adequate present capacity. • Enhanced function. • Future growth potential.
Capacity	• Present capacity exceeded. • No future capacity.	• Present capacity exceeded. • No future capacity.	• Present capacity exceeded. • No future capacity.	• Present capacity exceeded. • No future capacity.	• Present capacity exceeded. • No future capacity.	• Substantial present capacity. • Adequate future capacity.	• Substantial present capacity. • Adequate future capacity.	• Substantial present capacity. • Adequate future capacity.	• No significant impact.	• Substantial present capacity. • Adequate future capacity.
Level of Service	• Inadequate present LOS. • "Failing" future LOS.	• Inadequate present LOS. • "Failing" future LOS.	• Inadequate present LOS. • "Failing" future LOS.	• Inadequate present LOS. • "Failing" future LOS.	• Inadequate present LOS. • "Failing" future LOS.	• Adequate present LOS. • Acceptable future LOS.	• Adequate present LOS. • Acceptable future LOS.	• Adequate present LOS. • Acceptable future LOS.	• No significant impact.	• Adequate present LOS. • Adequate future LOS.
Safety	• High accident potential. • Continued driver frustration. • Animal accidents continue.	• High accident potential. • Continued driver frustration. • Animal accidents continue.	• High accident potential. • Continued driver frustration. • Animal accidents continue.	• High accident potential. • Continued driver frustration. • Animal accidents continue.	• Highest accident potential. • Reduced driver frustration. • Animal accidents continue.	• Reduced accident potential. • Driver frustration eliminated. • Animal accidents reduced.	• Least accident potential. • Driver frustration eliminated. • Animal accidents reduced.	• Reduced accident potential. • Driver frustration eliminated. • Animal accidents reduced.	• No significant impact.	• Reduced accident potential. • Driver frustration eliminated. • Animal accidents reduced.
Social / Economic	• Incompatible with land use goals. • Community character threatened. • Inconsistent with economic plans. • Doesn't meet public demands.	• Incompatible with land use goals. • Community character threatened. • Inconsistent with economic plans. • Meets demands for alternate transportation modes, but not greater capacity.	• Incompatible with land use goals. • Community character threatened. • Inconsistent with economic plans. • Meets demands for alternate transportation modes, but not greater capacity.	• Incompatible with land use goals. • Community character threatened. • Inconsistent with economic plans. • Meets demands for alternate transportation modes, but not greater capacity.	• Opportunities for land use coordination. • Community character threatened. • Partially consistent with economic plans. • Partially meets public demand.	• Compatibility with land use goals. • Community character preserved. • Consistent with economic plans. • Meets public demands.	• Compatibility with land use goals. • Community character preserved. • Consistent with economic plans. • Meets public demands.	• Compatibility with land use goals. • Community character preserved. • Consistent with economic plans. • Meets public demands.	• No significant impact.	• Compatibility with land use goals. • Community character preserved. • Consistent with economic plans. • Meets public demands.
Roadway Deficiencies	• Existing deficiencies remain. • Safety concerns uncorrected.	• Existing deficiencies remain. • Safety concerns uncorrected.	• Existing deficiencies remain. • Safety concerns uncorrected.	• Existing deficiencies remain. • Safety concerns uncorrected.	• Some deficiencies improved. • Some safety concerns corrected.	• Deficiencies eliminated. • Safety concerns corrected.	• Deficiencies eliminated. • Safety concerns corrected.	• Deficiencies eliminated. • Safety concerns corrected.	• Some deficiencies eliminated. • Some safety concerns corrected.	• Deficiencies eliminated. • Safety concerns corrected.
Modal Relationship	• Existing connections remain. • No improvements made. • Alternate modes ignored.	• Existing connections remain. • Some improvement made. • Alternate modes promoted.	• Existing connections enhanced. • Improvements made. • Alternate modes promoted.	• Existing connections enhanced. • Improvements made. • Alternate modes promoted.	• Existing connections remain. • No improvements made. • Alternate modes ignored.	• Existing connections remain. • No improvements made. • Alternate modes ignored.	• Existing connections remain. • No improvements made. • Alternate modes ignored.	• Existing connections remain. • No improvements made. • Alternate modes ignored.	• No significant impact.	• Existing connections enhanced. • Improvements offered. • Alternate modes promoted.

TABLE 2-12
EVALUATION OF ENVIRONMENTAL IMPACTS

Area of Impact	ALTERNATIVE									
	No Action	Park-&-Ride	Commuter Bus	Passenger Rail	Modified 2-Lane	4-Lane Undivided	4-Lane Divided	5-Lane	Alternate Alignments	Preferred Alternative
PHYSICAL ENVIRONMENT										
Water Resources										
Surface Waters	• Continued non-point pollution. • Highest potential for spills from accidents. • Hazardous treated timbers remain.	• Some reduction in non-point pollution. • Higher potential for spills from accidents • Hazardous treated timbers remain. • Runoff from more impervious surfaces.	• Continued non-point pollution. • Higher potential spills from accidents. • Hazardous treated timbers remain.	• Continued non-point pollution. • Higher potential spills from accidents. • Hazardous treated timbers remain. • Some short-term construction impacts.	• Placement of fills in stream areas. • Runoff from increased impervious pavement. • Short-term construction impacts. • Slightly reduced potential for spills from accidents. • Treated timbers removed.	• Placement of fills in stream areas. • Slightly more impervious surface. • Short-term construction impacts. • Reduced potential for spills from accidents. • Treated timbers removed.	• Placement of fills in stream areas. • Slightly more impervious surface. • Short-term construction impacts. • Reduced potential for spills from accidents. • Treated timbers removed.	• Placement of fills in stream areas. • Largest impervious surface. • Short-term construction impacts. • Reduced potential for spills from accidents. • Treated timbers removed.	• New crossing of Bitterroot River at Silver Bridge. • Reduction of surface water impacts in Bass Creek Hill area.	• Placement of fills in stream areas. • Largest impervious surface. • Short-term construction impacts. • Reduced potential for spills from accidents. • Treated timbers removed.
Groundwaters	• Highest potential for spills from accidents.	• Higher potential for spills from accidents.	• Higher potential for spills from accidents.	• Higher potential for spills from accidents. • Some potential for construction impacts.	• Slightly reduced spills from accidents. • Potential for construction impacts.	• Reduced potential for spills from accidents. • Potential for construction impacts.	• Reduced potential for spills from accidents. • Potential for construction impacts.	• Reduced potential for spills from accidents. • Potential for construction impacts.	• No impact.	• Reduced potential for spills from accidents. • Potential for construction impacts.
Floodplains	• No change to existing conditions.	• No change to existing conditions.	• No change to existing conditions.	• No change to existing conditions.	• 18.4 hectares additional encroachment.	• 20.5 hectares additional encroachment.	• 26.8 hectares additional encroachment.	• 23.0 hectares additional encroachment.	• New floodplain crossing at Silver Bridge, opportunity to improve hydraulics. • Eliminated floodplain encroachment at Bass Creek Hill.	• 21.6 hectares additional encroachment.
Air Quality	• Increase in CO and PM_{10} with increasing traffic. • CO concentrations greatest from congestion.	• Increase in CO and PM_{10} with increasing traffic. • CO concentrations greater from congestion.	• Increase in CO and PM_{10} with increasing traffic. • CO concentrations greater from congestion.	• Increase in CO and PM_{10} with increasing traffic. • CO concentrations greater from congestion.	• Increase in CO and PM_{10} with increasing traffic. • Some reduction to CO from improved traffic flow. • Temporary impacts from construction.	• Increase in CO and PM_{10} with increasing traffic. • Reduction to CO from improved traffic flow. • Temporary impacts from construction.	• Increase in CO and PM_{10} with increasing traffic. • Reduction to CO from improved traffic flow. • Temporary impacts from construction.	• Increase in CO and PM_{10} with increasing traffic. • Reduction to CO from improved traffic flow. • Temporary impacts from construction.	• Reduction in CO from improved grade at Bass Creek Hill.	• Increase in CO and PM_{10} with increasing traffic. • Reduction to CO from improved traffic flow. • Temporary impacts from construction.
Noise	• Noise impacts in areas within 30 m of centerline. • Increased noise from traffic operation (congestion). • 2 dBA noise increase from traffic growth.	• Noise impacts in areas within 30 m of centerline. • Increased noise from traffic operation (congestion). • 2 dBA noise increase from traffic growth.	• Noise impacts in areas within 30 m of centerline. • Increased noise from traffic operation (congestion). • 2 dBA noise increase from traffic growth.	• Noise impacts in areas within 30 m of centerline. • Increased noise from traffic operation (congestion). • 2 dBA noise increase from traffic growth.	• Slightly reduced noise from traffic operation (reduced congestion). • Temporary noise impacts from construction. • Noise impacts within 45 m of centerline.	• Slightly reduced noise from traffic operation (no congestion). • Temporary noise impacts from construction. • Noise impacts within 45 m of centerline.	• Slightly reduced noise from traffic operation (no congestion). • Temporary noise impacts from construction. • Noise impacts within 45 m of centerline. • Noise level 0-2 dBA higher than other "build" alternatives.	• Slightly reduced noise from traffic operation (no congestion). • Temporary noise impacts from construction. • Noise impacts within 45 m of centerline.	• Some noise reduction from easing grade at Bass Creek Hill. • Temporary noise impacts from construction. • Noise impacts within 45 m of centerline.	• Slightly reduced noise from traffic operation (no congestion). • Temporary noise impacts from construction. • Noise impacts within 45 m of centerline.
Hazardous Materials	• No construction impacts • Highest potential for spills from accidents.	• Minimal potential for construction impacts • Higher potential for spills from accidents.	• No construction impacts • Higher potential for spills from accidents.	• No construction impacts • Higher potential for spills from accidents.	• Low potential for construction impacts. • Reduced potential for spills from accidents.	• Moderate potential for construction impacts. • Reduced potential for spills from accidents.	• Greatest potential for construction impacts. • Reduced potential for spills from accidents.	• Moderate potential for construction impacts. • Reduced potential for spills from accidents.	• No impacts.	• Moderate potential for construction impacts. • Reduced potential for spills from accidents.
Visual / Aesthetics	• Deterioration of quality from high traffic volume and congestion.	• Deterioration of quality from high traffic volume and congestion.	• Deterioration of quality from high traffic volume and congestion. • Short-term degradation from construction.	• Deterioration of quality from high traffic volume and congestion.	• Short-term degradation from construction. • Opportunities to enhance visual quality.	• Short-term degradation from construction. • Opportunities to enhance visual quality.	• Short-term degradation from construction. • Opportunities to enhance visual quality. • Visual distraction in large cuts and fills.	• Short-term degradation from construction. • Opportunities to enhance visual quality. • Visual distraction from wide pavement and increased access.	• Opportunities to enhance visual quality. • Opens vista at Bass Creek Hill from guardrail removal. • Removes visual obstruction at Silver Bridge.	• Short-term degradation from construction. • Opportunities to enhance visual quality.
BIOLOGICAL ENVIRONMENT										
Vegetation	• No impacts.	• Minimal impact from construction.	• No impacts.	• Minimal impact.	• Some loss of vegetation from construction.	• Moderate loss of vegetation from construction.	• Highest loss of vegetation from construction.	• Moderate loss of vegetation from construction.	• Moderate loss of vegetation from construction.	• Moderate loss of vegetation from construction.
Wetlands	• No direct loss. • Non-point runoff pollution potential.	• No direct loss. • Non-point runoff pollution potential.	• No direct loss. • Non-point runoff pollution potential.	• No direct loss. • Non-point runoff pollution potential.	• Non-point runoff pollution potential from placement of fill. • Potential direct loss of 16.5 hectares.	• Non-point runoff pollution potential from placement of fill. • Potential direct loss of 18.1 hectares.	• Non-point runoff pollution potential from placement of fill. • Potential direct loss of 27.8 hectares.	• Non-point runoff pollution potential from placement of fill. • Potential direct loss of 20.7 hectares.	• Non-point runoff pollution potential from placement of fill.	• Non-point runoff pollution potential from placement of fill. • Potential direct loss of 19.0 hectares.

TABLE 2-12
EVALUATION OF ENVIRONMENTAL IMPACTS

Area of Impact	ALTERNATIVE									
	No Action	Park-&-Ride	Commuter Bus	Passenger Rail	Modified 2-Lane	4-Lane Undivided	4-Lane Divided	5-Lane	Alternate Alignments	Preferred Alternative
Wildlife	• No habitat impact. • Highway collision mortality increases as traffic volume increases.	• No habitat impact. • Highway collision mortality increases as traffic volume increases.	• No habitat impact. • Highway collision mortality increases as traffic volume increases.	• No habitat impact. • Highway collision mortality increases as traffic volume increases.	• Highway collision mortality increases as traffic volume increases. • Minor impact to habitat. • Slight increase in potential for collisions due to wider roadway and some opportunity for avoidance using additional lanes and shoulders.	• Highway collision mortality increases as traffic volume increases. • Moderate impact to habitat. • Moderate increase in potential for collisions due to wider roadway. • Opportunity for avoidance using additional lanes and shoulders.	• Highway collision mortality increases as traffic volume increases. • Greatest impact to habitat. • Greatest increase in potential for collisions due to wider roadway. • Opportunity for avoidance using additional lanes and shoulders.	• Highway collision mortality increases as traffic volume increases. • Moderate impact to habitat. • Moderate increase in potential for collisions due to wider roadway. • Opportunity for avoidance using additional lanes and shoulders.	• Highway collision mortality increases as traffic volume increases. • Moderate impact to habitat.	• Highway collision mortality increases as traffic volume increases. • Moderate impact to habitat. • Moderate increase in potential for collisions due to wider roadway. • Opportunity for avoidance using additional lanes and shoulders.
Fish	• Minimal impact.	• Minimal impact.	• Minimal impact.	• Minimal impact.	• Stream disturbance and short-term suspended sediment during construction. • Potential barriers to fish passage at culverts.	• Stream disturbance and short-term suspended sediment during construction. • Possible stream rechannelization. • Potential barriers to fish passage at culverts. Possible improvements of bridges.	• Stream disturbance and short-term suspended sediment during construction. • Possible stream rechannelization. • Potential barriers to fish passage at culverts. Possible improvements of bridges.	• Stream disturbance and short-term suspended sediment during construction. • Possible stream rechannelization. • Potential barriers to fish passage at culverts. Possible improvements of bridges.	• Minimization of impact at Bass Creek Hill. • Improvements to hydraulics and channel scour at Silver Bridge.	• Stream disturbance and short-term suspended sediment during construction. • Possible stream rechannelization. • Potential barriers to fish passage at culverts. Possible improvements of bridges.
Threatened and Endangered Species	• No impact.	• No impact.	• No impact.	• No impact.	• Not likely to adversely affect.	• Not likely to adversely affect.	• Not likely to adversely affect.	• Not likely to adversely affect.	• No impact.	• Not likely to adversely affect.
HUMAN ENVIRONMENT										
Social										
Population and Growth	• Inhibited growth.	• Possible wider distribution of growth.	• Possible wider distribution of growth.	• Possible wider distribution of growth.	• No impact.	• Slight impact on timing and location of growth.	• Slight impact on timing and location of growth.	• Slight impact on timing and location of growth.	• No impact.	• Slight impact on timing and location of growth.
Community Cohesion	• Major impacts and barriers to social interaction from congestion. • Strip growth may overrun communities.	• Facilitates social interaction. • Impacts and barriers to social interaction from congestion. • Strip growth may overrun communities.	• Facilitates social interaction. • Impacts and barriers to social interaction from congestion. • Strip growth may overrun communities.	• Facilitates social interaction. • Impacts and barriers to social interaction from congestion. • Strip growth may overrun communities.	• Opportunity to control development in rural areas and densify urban areas. • Community character preserved.	• Opportunity to control development in rural areas and densify urban areas. • Community character preserved.	• Opportunity to control development in rural areas and densify urban areas. • Community character preserved.	• Opportunity to control development in rural areas and densify urban areas. • Community character preserved.	• No impact	• Opportunity to control development in rural areas and densify urban areas. • Community character preserved. • Facilitates social interaction.
Access Barriers and Isolation	• Existing facility more of a barrier from congestion. • Difficulty in access from congestion.	• Existing facility more of a barrier from congestion. • Difficulty in access from congestion.	• Existing facility more of a barrier from congestion. • Difficulty in access from congestion.	• Existing facility more of a barrier from congestion. • Difficulty in access from congestion.	• Reduction of barrier effect through reducing congestion and smoothing traffic flow. • Difficulty for left-hand turning access.	• Reduction of barrier effect through reducing congestion and smoothing traffic flow. • Difficulty for left-hand turning access.	• Reduction of barrier effect through reducing congestion and smoothing traffic flow. • Center median is barrier to access.	• Reduction of barrier effect through reducing congestion and smoothing traffic flow. • Highest degree of access	• No impact.	• Reduction of barrier effect through reducing congestion and smoothing traffic flow. • Access difficulty in rural areas improvements in urban areas.
Displacement/ Relocations	• None	• None	• None	• None	• 10 miscellaneous. • Utility relocations required.	• 10 miscellaneous. • Utility relocations required.	• 5 homes, 6 business, and 17 miscellaneous. • Utility relocations required.	• 10 miscellaneous. • Utility relocations required.	• 2 miscellaneous at Silver Bridge.	• 10 miscellaneous. • Utility relocations required.
Economic	• Inconsistent with Economic Development Plans. • No cost.	• Inconsistent with Economic Development Plans. • Cost; $0.5 Million • Least cost per user.	• Inconsistent with Economic Development Plans. • Cost; $0.4 Million • Higher cost per user.	• Inconsistent with Economic Development Plans. • Cost; $48 Million • Highest cost per user.	• Opportunities for economic development. • Improved circulation. • Cost; $26 Million • Moderate cost per user.	• Opportunities for economic development. • Improved circulation. • Potential loss of parking areas and reduction of access. • Cost; $31.3 Million • Moderate cost per user.	• Opportunities for economic development. • Improved circulation. • Potential loss of parking areas and reduction of access. • Cost; $39.6 Million • Moderate cost per user.	• Opportunities for economic development. • Improved access to commercial properties. • Improved circulation. • Potential loss of parking areas and reduction of access. • Cost; $37.7 Million • Moderate cost per user.	• No impact.	• Opportunities for economic development. • Improved access to commercial properties. • Improved circulation. • Potential loss of parking areas and reduction of access. • Cost; $33.9 Million • Moderate cost per user.
Land Use	• Unlimited access. • No change to present land use.	• Unlimited access. • 2.2 hectares right-of-way. • No change to present land use.	• Unlimited access. • 1.6 hectares right-of-way. • No change to present land use.	• Unlimited access. • 1.1 hectares right-of-way. • No change to present land use.	• Restricted access where additional lane used. • 34.6 hectares right-of-way. • Opportunity to support land use plans.	• Restricted access in rural areas. • 38.0 hectares right-of-way. • Opportunity to support land use plans.	• Least degree of access. • 82.7 hectares right-of-way. • Opportunity to support land use plans.	• Highest degree of access. • 43.5 hectares right-of-way. • Opportunity to support land use plans.	• No impact.	• Restricted access in rural areas, open access in urban areas. • 39.9 hectares right-of-way. • Opportunity to support land use plans.

TABLE 2-12
EVALUATION OF ENVIRONMENTAL IMPACTS

Area of Impact	ALTERNATIVE									
	No Action	Park-&-Ride	Commuter Bus	Passenger Rail	Modified 2-Lane	4-Lane Undivided	4-Lane Divided	5-Lane	Alternate Alignments	Preferred Alternative
Farmland	• No impact.	• No impact.	• No impact.	• No impact.	• 0.3 hectares prime or statewide important farmland.	• 0.3 hectares prime or statewide important farmland.	• 1.1 hectares prime or statewide important farmland.	• 0.4 hectares prime or statewide important farmland.	• No impact.	• 0.4 hectares prime or statewide important farmland.
Transportation	• No improvements to physical highway conditions. • No improvement to capacity. • Inadequate LOS. • No safety improvements. • Highest accident rate potential in rural areas. • Higher accident potential in commercial areas. • Higher projected accident severity. • No improvement to pedestrian / bicycle facilities. • Inconsistent with transportation plans.	• No improvements to physical highway conditions. • Very minor improvement to capacity. • Inadequate LOS. • No safety improvements. • Higher accident rate potential in rural areas. • Higher accident potential in commercial areas. • Higher projected accident severity. • Some improvement to pedestrian / bicycle facilities. • Inconsistent with transportation plans, except alternate modes.	• No improvements to physical highway conditions. • Very minor improvement to capacity. • Inadequate LOS. • No safety improvements. • Higher accident rate potential in rural areas. • Higher accident potential in commercial areas. • Higher projected accident severity. • Some improvement to pedestrian / bicycle facilities. • Inconsistent with transportation plans, except alternate modes.	• No improvements to physical highway conditions. • Very minor improvement to capacity. • Inadequate LOS. • No safety improvements. • Higher accident rate potential in rural areas. • Higher accident potential in commercial areas. • Higher projected accident severity. • Some improvement to pedestrian / bicycle facilities. • Inconsistent with transportation plans, except alternate modes.	• Partial improvements to current standards. • Some improvement to capacity. • Inadequate present and future LOS. • Some safety improvements. • Reduced accident rate potential in rural areas. • Slightly higher accident potential in commercial areas. • Reduced projected accident severity. • Major improvement to pedestrian / bicycle facilities. • Somewhat consistent with transportation plans.	• Improvements to current standards. • Adequate present and future capacity. • Adequate present and future LOS. • Safety improvements. • Reduced accident rate potential in rural areas. • Slightly higher accident potential in commercial areas. • Reduced projected accident severity. • Major improvement to pedestrian / bicycle facilities. • Consistent with transportation plans.	• Improvements to current standards. • Adequate present and future capacity. • Adequate present and future LOS. • Safety improvements. • Reduced accident rate potential in rural areas. • Slightly higher accident potential in commercial areas. • Highest projected accident severity. • Major improvement to pedestrian / bicycle facilities. • Consistent with transportation plans.	• Improvements to current standards. • Adequate present and future capacity. • Adequate present and future LOS. • Safety improvements. • Reduced accident rate potential in rural areas. • Slightly higher accident potential in commercial areas. • Reduced projected accident severity. • Major improvement to pedestrian / bicycle facilities. • Consistent with transportation plans.	• Some improvements to physical highway conditions.	• Improvements to current standards. • Adequate present and future capacity. • Adequate present and future LOS. • Safety improvements. • Reduced accident rate potential in rural areas. • Slightly higher accident potential in commercial areas. • Reduced projected accident severity. • Major improvement to pedestrian / bicycle facilities. • Consistent with transportation plans.
Historic Resources	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.
Cultural Resources	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.	• No impact.
Recreation	• No impact.	• No impact.	• No impact.	• No impact.	• Opportunity for improved access to recreational facilities.	• Opportunity for improved access to recreational facilities.	• Opportunity for improved access to recreational facilities.	• Opportunity for improved access to recreational facilities.	• No impact.	• Opportunity for improved access to recreational facilities.

Evaluation of Transportation Demand Management (TDM): TDM is a process that allows management of traffic in innovative ways to reduce congestion without the expense and inconvenience of additional road construction. The following information reviews TDM conditions in the corridor, presents feasible TDM alternatives for consideration, and provides an evaluation of the potential success of those alternatives.

A discussion of conditions in the corridor contributing to the high dependency on single-occupant vehicles (SOV) is appropriate. Existing economic conditions provide ample employment opportunities associated with the larger metropolitan centers of Missoula and Hamilton to the north and south ends of the project corridor, respectively. The high cost of housing in these urban areas, together with the "freedom", lower cost, reasonable commute (time and cost), quality of life, and aesthetic appeal of living in outlying areas has encouraged the growth of "bedroom" communities and created a dependence on commuting from these rural areas to the urban centers.

Other important factors contributing to the use of single-occupant vehicles are as follows:

- Scattered, smaller employment sites as opposed to centralized "campuses" with large businesses employing a considerable number of people.
- Ample free parking everywhere (including "downtown" areas) with little or no restriction.
- Relatively short commute times and distances.
- No government or public agency involvement in transportation demand management and public resistance to such involvement.
- Sparse densities for both residences and businesses.
- Independent and "self-reliant" attitude of local residents.
- No employer incentives to reduce traffic.
- Lack of ordinances, government policies, or other legal requirements supporting traffic or travel reduction.

Since the congestion associated with commuting is becoming a significant problem, and in response to local public input regarding the possibilities of public transportation systems to help reduce the dependency on SOV's, a Transportation Demand Management Study[9] was conducted to determine the feasibility of implementing transportation demand management (TDM) measures. Simply stated, TDM is a process that allows involved citizens to manage vehicular traffic in their communities in innovative ways (possibilities discussed below) that reduce congestion without the expense and inconvenience of additional road construction.

The Study was conducted by first searching and reviewing literature to summarize current nation-wide trends and issues in TDM. Secondly, a knowledge of local conditions and attitudes concerning TDM was obtained through the use of the traffic and telephone surveys as discussed elsewhere in this report. Survey information was supplemented by a more theoretical study estimating transit demand in Ravalli County as well as a background report on the Bitterroot Valley inventorying current para-transit and public transit providers and major traffic generation centers. Feasibility studies of both rail and bus systems were also conducted. Lastly, focus groups (randomly selected citizens given freedom to exchange ideas on traffic congestion) were convened to discuss the feasibility and appeal of TDM alternatives.

All of these efforts combined to create a list of potential TDM techniques to be considered for application in the study area:

- **Parking**: Restricting free parking, implementating fees, providing preferential parking for carpools, etc.

- **Car/Van Pools**: Providing public education and encouragement, and establishing an organization to develop and manage rideshare programs and park-n-ride facilities.

- **Land Use**: Creating centers of activity, densifying commercial areas, and providing for easy access by transit.

- **Trip Chaining**: Clustering buildings within a site and offering auxiliary services (grocery, drugstore, cleaners, etc.) within easy walking distances.

- **Mixed Land Use**: Mixing employment sites and residential areas together to reduce the need for transportation between.

- **Flex Time**: Varying working hours to reduce transportation demand at peak hours.

- **Mass Transit**: Developing commuter rail and public bus systems for commuter use.

- **Government Involvement**: Enacting incentive ordinances, rideshare ordinances, tax incentives, etc.

The need for traffic reduction is great and a lessening of dependence on SOV's will bring positive benefits. The following information reports the conclusions of the study with the regard to the feasibility of these various items:

- <u>Parking</u> - Parking management is a major element for success in any TDM scheme. Preferential parking works best at specific employment sites where employment is large and parking is scarce, costly, or inconvenient enough to make parking privileges a tangible incentive. None of these conditions are present in the corridor area; 85% of respondents in the telephone survey indicated parking was not a problem. On-site parking is available to 79% of those surveyed and 91% paid nothing for parking.

  These figures indicate that the probability of any parking, pricing, or management tactics will easily be circumvented by the abundance of free parking at employment sites in the corridor. This condition notwithstanding, employers granting parking incentives to those utilizing car and van pools will be a good step in the right direction toward reducing single-occupant vehicles (SOV).

- <u>Car/Van-Pools and Park-and-Ride Lots</u> - Carpools combined with park-and-ride lots had the most favorable response in public surveys and focus groups. A definite lack of public education exists in this regard - only 2% mentioned this technique when asked to name the first thing that came to mind to fix Highway 93's congestion problem. However, 21% chose it when presented a list of suggested solutions.

  The study concludes that most people prefer traveling in private vehicles, usually alone, because such travel provides convenience, comfort, privacy, and speed far superior to that of public transit. However, implementation of this change is possible if people perceive they are gaining more (time, convenience, cost, reduced stress) than they are giving up (individual freedom of action). This exchange is difficult enough in large congested urban settings and even more so in the Bitterroot Valley where residents have often expressed individualism, freedom, and self-reliance.

  The study points out the popularity of this item in the public mind coupled with its comparatively low cost for implementation combine to create a better chance of success over some other options. The focus groups provided specific recommendations on how the system should be set-up, but the bottom line indicates that some agency or mechanism is needed to make it happen. Accordingly, it is recommended to establish a Transportation Management Association (TMA), a private non-profit

organization of individuals and civic leaders committed to improving local transportation, to establish and administrate TDM measures including carpooling and the park-and-ride system.

- Land Use - People in the Bitterroot Valley have chosen a dispersed land settlement pattern. This type of land use pattern is very difficult for any form of transportation to accommodate other than private cars. Unfortunately, current conditions are that travel is cheaper than land and with the inexpensive availability of land in the area, people have traded the convenience of saving time and energy by using shorter trips, for having more land in more beautiful and remote locations.

  In the telephone survey nearly half the commuters indicated a commute distance of 13 to 19 km (21 to 30+ miles) one way. Questions on commuting attitudes indicated the issue of prime importance to commuters is saving money, not time.

  The land use patterns now in place were initiated 20 years ago. With TMA's organizing and promoting TDM activities in the area, together with the support of the business community and county land use plans, land use patterns of the next 20 years could be influenced to include transit amenable land use and development.

- Trip Chaining - Presently employees run all over to get services. In order of reported frequency, people stop for gas, groceries, banking, other shopping, food, business meetings, entertainment, and classes. Less frequent stops are school, exercise facilities, carpools, and dry cleaners. If such services can be delivered to the work place or established nearby (within walking distance) fewer vehicle trips will be required and employees will have more time to work. Currently, conditions in the corridor are not really conducive to this, but an awareness of it and support through a TMA can encourage future planning and land use development efforts to emphasize this possibility as a way to reduce traffic congestion.

- Mixed Land Use - The current development pattern of the Bitterroot Valley is one of continuous sprawl. A combination of land use and trip chaining can be utilized to encourage filling in the empty spaces that exist within almost every community, densifying development and making it more easily served by transit and high occupancy vehicle commuters (carpools). Once again, TMA's in concert with local land use plans and policies can encourage this densification; thereby providing a reduction in traffic.

- Flex Time - The telephone and traffic surveys clearly indicated substantial traffic volume increases in the 7 to 9 a.m. and 4 to 6 p.m. timeframes. Spreading out the commute periods would be a relatively easy way to reduce congestion and increase highway capacity by reducing peak demand. Information from the surveys suggested employees had remarkable opportunity to change their work schedule, but most indicated that if given a choice they would not. TMA's could enlist the support of employers and assist in arranging flex time at the work place. Not all will be able to take advantage of this, but it is a useful tool. Flex time does little to reduce the number of vehicle trips taken, but it can help reduce peak period congestion for a number of years before other measures need to be implemented.

- Bus System - After widening the highway to 4-lanes, mass transit was the next choice of respondents in the telephone and traffic surveys for reducing congestion on highway 93. People generally had a good opinion of public transit, recognizing it reduces traffic congestion and pollution, saves energy, and is an important resource for those who lack other forms of transportation. The focus groups supported mass transit while at the same time placing demands on it that are difficult to satisfy. For example, one group wanted a commuter bus with low costs, convenient and frequent stops, and as little time spent on the bus as possible.

  While focus groups were interested in mass transit with half the participants mentioning it as their first choice of transportation alternatives, mass transit would have difficulty serving the Bitterroot Valley. Mass transit works best in areas of dense population with gross densities of 1600 to 2300 persons per square kilometer (4000 to 6000 persons per square mile). Below this threshold public transit use is

quite minimal. This density equates to 3 to 6 dwellings per hectare (7 to 15 dwellings per acre), which densities do not exist in the Bitterroot Valley outside the very small communities.

An additional problem is the many small employment sites dispersed in the area that would require numerous stops by a bus and considerable time to reach all locations. If bus trips took longer than a trip by car, commuters would not ride the transit service unless strong incentives existed to discourage people from driving their cars to work. Again, these conditions do not exist in the study area.

One of the best ways to assess actual demand for a transportation alternative is to conduct a demonstration. This was done during the summer of 1993 with the Valley Coach Commuter that offered private sector, limited commuter transit service between Missoula and the Bitterroot Valley from July 12th to August 13th. The primary market for the bus was commuters traveling daily to major employment centers in Missoula from the Bitterroot Valley. The endeavor was started at a poor time of year for bus service (summer) and had virtually no marketing support. The commuter carried an average of five regular passengers per day for a daily loss of $250. Due to lack of demand, Valley Coach ceased operations.

Mass transit cannot satisfy all of the demands - low fares, fast service, frequent stops, and service to several job sites. Transit systems in large cities have trouble meeting these or similar demands even with a large, densely-settled population. In a dispersed semi-rural and suburban area where most of the potential riders live (such as the Bitterroot Valley) mass transit is not a viable transportation alternative.

- Rail System - There is a great deal of interest on the part of the public and focus groups toward rail service as a possible means of alternative transportation. However, there are serious challenges with implementing rail service in the Bitterroot Valley. The existing track between Hamilton and Missoula is currently rated at a top speed of 21.7 km/h (35 mph) and serves for freight purposes only. In order to run commuter trains at higher speeds (at least 28 km/h [45 mph]) the entire length of track would have to be replaced at phenomenal cost.

  Along its length there are many crossings of the track that would require signals and crossing gates. The many private easements that cross the tracks would not have signals; therefore posing a constant safety danger to the train and vehicles alike. The higher speeds of the trains necessary to compete with cars would likely generate opposition from those who live along the railroad and would make many crossings more dangerous. If more than two trips a day were provided, a centralized traffic control system would have to be installed whose price tag alone is over $2.0 million.

  Commuter rail services in the most densely populated areas of the United States have a great deal of difficulty in covering their daily operating expenses and never fully recover their initial capital outlay. With the Bitterroot Valley's low population densities rail service could not possibly generate enough passengers to cover even a portion of its initial construction and operational expenses. Other discouraging conditions are the lack of major traffic generators in the area and the absence of a dedicated funding source (without new taxes) necessary to offset operating deficits.

  Montana Rail Link was solicited to comment on the feasibility of initiating passenger rail service into the Bitterroot. In addition to providing cost estimates for the two options explained earlier in this document, a brief letter from the chief engineer[10] concluded,

  > *"... a railroad-based commuter service between Missoula and Hamilton is not economically feasible and could never be justified. This position could also be based on the history of commuter rail services in major metropolitan areas which seldom recover their daily cost of operation and never recover their initial capital outlay."*

- Government Involvement - Commuters in the study corridor unknowingly face a dilemma; they want the benefits of curtailed congestion without the price every TDM effort requires -- the force of law. Most TDM measures succeed only if there is either financial self-interest or the threat of penalties or fines assessed by government.

  Participants in the focus groups enjoyed the experience and were surprised and gratified that someone else was thinking and doing something about congestion and overcrowded roads. Most emerged from the meetings with a "can do" attitude that together they could solve this problem locally. But all they wanted from government was assistance, education, and support. No taxes, new ordinances, cumbersome regulations, or restrictions on freedom were desired. This enthusiasm, if coupled with persistence, creates the key ingredients for successful implementation of TDM measures. However, these attitudes clearly indicate that government intervention or involvement in implementing or mandating TDM is ill-advised.

After evaluating local information and obtaining the opinions of residents about established TDM processes used nationwide, there appears to be very few of the characteristics and circumstances necessary for a successful TDM program in the Bitterroot Valley. Two of the key components (large employers and inadequate parking supply) are not present in the area. The sparse densities for both residences and businesses are not conducive to the standard TDM activities such as mass transit, vanpools, and carpools. With the exception of conditions in Missoula, there are not persistent air pollution problems that would force public agencies to impose traffic reduction on the area.

Even if conditions were present that would lead to imposition of traffic reduction in the corridor, this form of intervention would be greatly resented by the independent-minded residents of the area. No form of government regulation would be welcomed, no new taxes or tax increases are desired, and no outside intervention is sought by the local citizens. Survey respondents and focus group participants over and over again expressed the desire to solve traffic congestion problems on their own.

A bright spot is that many recognize the need to do something to alleviate traffic congestion on US 93. Although they recognize they need some help in the form of education, advice, and technical assistance, they still desire to be in charge of whatever is done. Table 2-13 compares the characteristics associated with successful TDM nationally against those existing in the study corridor:

TABLE 2-13
NATIONWIDE TDM CHARACTERISTICS VRS. STUDY CORRIDOR

Nationwide Characteristics	Hamilton/Lolo Characteristics
large employment sites	scattered, smaller employment sites
restricted or expensive parking	ample, free parking
persistent, widespread air pollution	air pollution in Missoula only
present and future economic growth limited by traffic congestion	traffic congestion not yet interfering with economics, may in future
legal requirements for TDM	no requirements in existence and none desired by residents
employer leadership	no employer interest
government or public agency involvement	no government or public agency involvement in existence and none desired
public/private cooperation	public involvement not desired
desire to manage congestion with TDM alternatives to road construction	growing interest in alternative methods of traffic management
enthusiasm and persistence	enthusiasm, persistence by a few individuals

One of the most striking conclusions drawn from the TDM study, which was based on intensive public involvement, is the dichotomy between the independence and freedom insisted upon by the area's residents and the proven need for cooperation and group action necessary for any successful TDM program. Some form of sacrifice in terms of time, convenience, money, or independence must be made for even the simplest form of TDM to work. The reconciliation of these two opposing values -- independence and cooperation -- will be the real challenge for any TDM process that might be implemented in the Bitterroot Valley.

The recommendations of the TDM study recognize the enthusiasm, energy, and confidence of local residents to solve their own problems. This enthusiasm should be capitalized on by the establishment of TMA's in Ravalli, Missoula, and Lake counties. The three TMA's should be coordinated by a "circuit rider" administrator who would promote TDM in the entire region and provide the technical assistance, education, and advice that the residents of the areas desire.

A TMA has already been established in the Bitterroot. A steering committee has been organized and meeting on a fairly regular basis with MDT representatives (and funding) to organize the TMA and set-up the mechanism for its management. MDT is providing funding for start-up in the hopes that the TMA can soon become self-sufficient by contributions from employers, local governments, civic groups, and interested citizens to carry forward TDM activities.

The preferred alternative includes the recommendation to establish park-and-ride lots as an initial step toward traffic congestion reduction. While construction of the proposed facilities can be provided for as a part of the proposed action recommended by this document, on-going operation, management, and administration of the facilities would necessarily become the responsibility of the TMA.

With the TMA in place, public education can begin and further enthusiasm can be generated toward TDM. TMA's can assist future land use patterns toward TDM-friendly development as well as densification and encouragement for provision of on-site services in major employment areas. TMA's can encourage residents to think twice about that extra car trip or assist them in making carpool arrangements. Most importantly, TMA's can begin the important process of instilling the idea in local residents that traffic congestion can be solved, not necessarily by more concrete, but by individual and community action.

2.10 REFERENCES

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3. *"US 93 Hamilton to Lolo Public Participation Plan"* - Forsgren Associates; West Yellowstone, MT - September 1992

4. Multi-Lane Design Alternatives for Improving Suburban Highways, National Cooperative Research Program Report 282 - Transportation Research Board, National Research Council, March 1986

5. *"Hamilton - Lolo Transportation Corridor Analysis"* - Peter Schauer Associates; Boonville, MO - January 7, 1994

6. *"Evaluation of Silver Bridge Realignment Alternatives"* - Forsgren Associates; West Yellowstone, MT - June 1994

7. *"Economic Analysis"* - Forsgren Associates; West Yellowstone, MT - March 1994

8. A Policy on Geometric Design of Highways and Streets - American Association of State Highway and Transportation Officials (AASHTO); Washington D.C. 1994 Edition

9. *"Hamilton-Lolo Transportation Corridor Analysis"* - Peter Schauer Associates; Boonville, MO - January 7, 1994

10. Montana Rail Link - Letter from Richard Keller, chief engineer to Kevin McCann; May 19, 1993

CHAPTER 3.0

AFFECTED ENVIRONMENT

AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This Chapter provides background information on conditions that currently exist within the study corridor. Its purpose is to provide baseline data to which the effects of proposed actions can be compared in order to identify the nature and magnitude of anticipated impacts (Chapter 4.0). For the sake of convenience and organization, information in this chapter is presented in three major categories:

- A. Physical Environment
- B. Biological Environment
- C. Human Environment

Information presented in each of these categories was taken from the various background studies completed as preparatory to this environmental document, current literature, and information received from the public through the public involvement process to help identify existing conditions.

Natural Setting: The study corridor is located within the Bitterroot Valley, a north-south trending intermountain basin in Western Montana. The Valley is bounded on the west by the Bitterroot Mountain range and on the east by the Sapphire Mountains. The Bitterroot River drains the Valley in a south to north direction, being fed by numerous perennial and seasonal surface water courses which flow into the river from the mountain ranges.

The mountains bordering the project area are composed of igneous, metamorphic, and sedimentary rocks. The Bitterroot Mountains have been intensely glaciated and glacial debris has accumulated in a series of finger ridges, terraces, and low foothills in the west side of the Valley and finer-grained stream deposits have accumulated in the eastern portions of the Valley. The erosional products of this glacial activity have been deposited in the Valley in depths reported to exceed 450 m (1500 ft). Soils in the project area are stony and gravelly coarse sand loams with loamy soils present in the lower drainage areas.

Two general water bearing systems are present in the project area. The first is an upper system perched above the lower groundwater system, which carries surface waters and shallow groundwaters reacting to seasonal changes in recharge from the nearby mountains. The depth to the base of this upper system is approximately 3 m (10 ft) at some locations in the project area. The lower aquifer is composed of a series of sand and gravel lenses saturated by deep groundwater systems infiltrated from deep percolation in the nearby mountain ranges.

The climate is characterized by Pacific climate weather patterns. Precipitation averages 38 cm (15 inch) per year, most of that coming in the form of snows during the winter and occasional strong thunderstorms during the summer months. Average temperatures are 28°C (80°F) in the summer and 0°C (30°F) in the winter.

The geologic setting provides the area with rich scenic beauty, which together with the abundant natural and biological resources have created a strong attraction for the human environment.

A. PHYSICAL ENVIRONMENT

3.2 WATER RESOURCES

Water resources in the Bitterroot Valley are abundant. Numerous surface water courses drain the adjacent mountain areas into the Bitterroot River which flows through the Valley. Much of the Valley has a shallow groundwater table or perched groundwater aquifers that could be susceptible to surface activity. The following information will generally describe surface and groundwater features, water quality issues, floodplains, and related data forming the background for water resource information on this project.

Surface Waters: The Bitterroot River and its tributaries form a major drainage basin within the boundaries of the Bitterroot Mountains to the west and the Sapphire Mountains to the east. Figure 3-1 shows the principal surface waters in the study area. From its headwaters at the southern end of Ravalli County, the Bitterroot River follows a course northward through the central part of the Valley into Missoula County where it connects to the Clark Fork River in Missoula. The Clark Fork is a tributary to the Columbia River which then reaches the Pacific Ocean.

Tributaries of the Bitterroot River within the study corridor flow from the Bitterroot Mountain range on the west into the Bitterroot River lying easterly of and essentially paralleling the existing highway in this corridor. Originating in the mountains a short distance away with elevations between 2400 and 3000 m (8,000 to 10,000 ft), these streams have very steep gradients until they approach the Bitterroot River on the Valley floor. Streambeds are characterized by cuts through alluvial deposits with boulders, cobbles, and sand and gravel deposits being prevalent. Major tributaries that cross the existing highway alignment, which have the potential to be impacted by any proposed improvements include the following:

- Blodgett Creek
- Sweathouse Creek
- Bass Creek
- Tie Chute Creek
- Churn Creek
- Big Creek
- Larry Creek
- Carlton Creek
- Fred Burr Creek
- McCalla Creek
- Sweeny Creek
- Maple Creek
- Bear Creek
- Kootenai Creek
- One-Horse Creek
- Lolo Creek

Further specific individual discussion of these crossings is contained in the 404(b)(1) evaluation included in Appendix C. There are no major lakes, reservoirs, or other similar surface water impoundments within the study area. However, there are numerous wetland areas associated with either shallow groundwater or surface water areas. These wetland areas are separately discussed in Section 3.9.

Irrigation activity is also significant in the project corridor. Water is diverted from the surface water streams as they flow out of the mountain range and onto alluvial terraces and benches prior to reaching the Valley floor. Water is also diverted from the Bitterroot River as it flows down-gradient (south to north) through the corridor and a few irrigation canal networks in the project corridor come from this source. Irrigation water is used predominantly for agricultural operations and since the existing highway splits contiguous agricultural lands in many locations, there are numerous irrigation crossings of the highway throughout the corridor.

Groundwater: The Bitterroot Valley's groundwater table is found at fairly shallow depths throughout the study area. Even on the terraces and benches there are areas of perched groundwaters which are in close proximity to the surface. Figure 3-2 is a groundwater contour map of the project area completed some years ago by the Soil Conservation Service (SCS). The report from which the information was taken indicates the potential yield of wells in the area would vary from less than 190 lpm (<50 gpm) in the terrace and finger-ridge areas to over 950 lpm (250 gpm) on the Valley floor near the Bitterroot River. Agricultural activities in the project area rely heavily on groundwater wells to enhance or add to surface water irrigation.

FIGURE 3-1
PRINCIPAL SURFACE WATERS

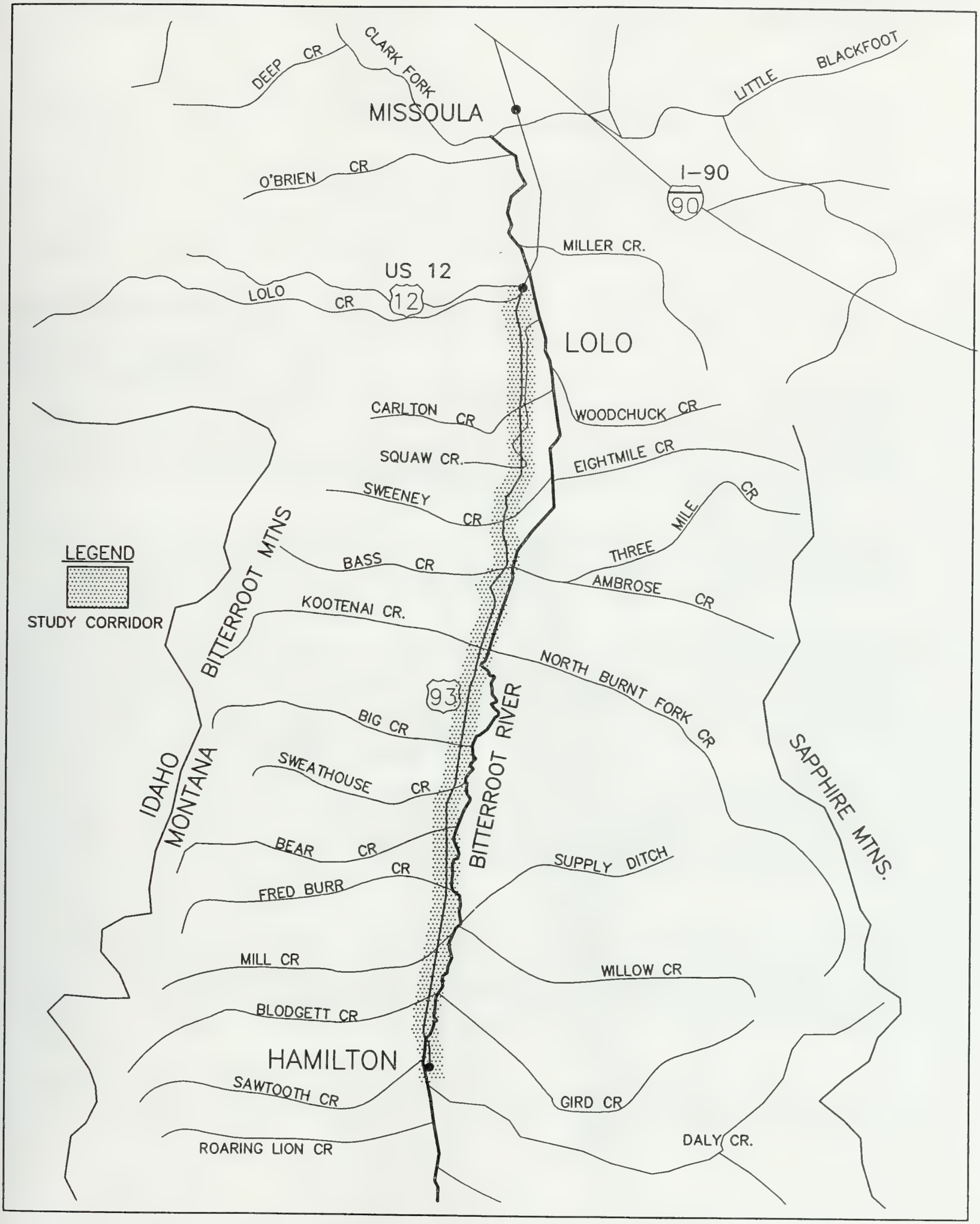
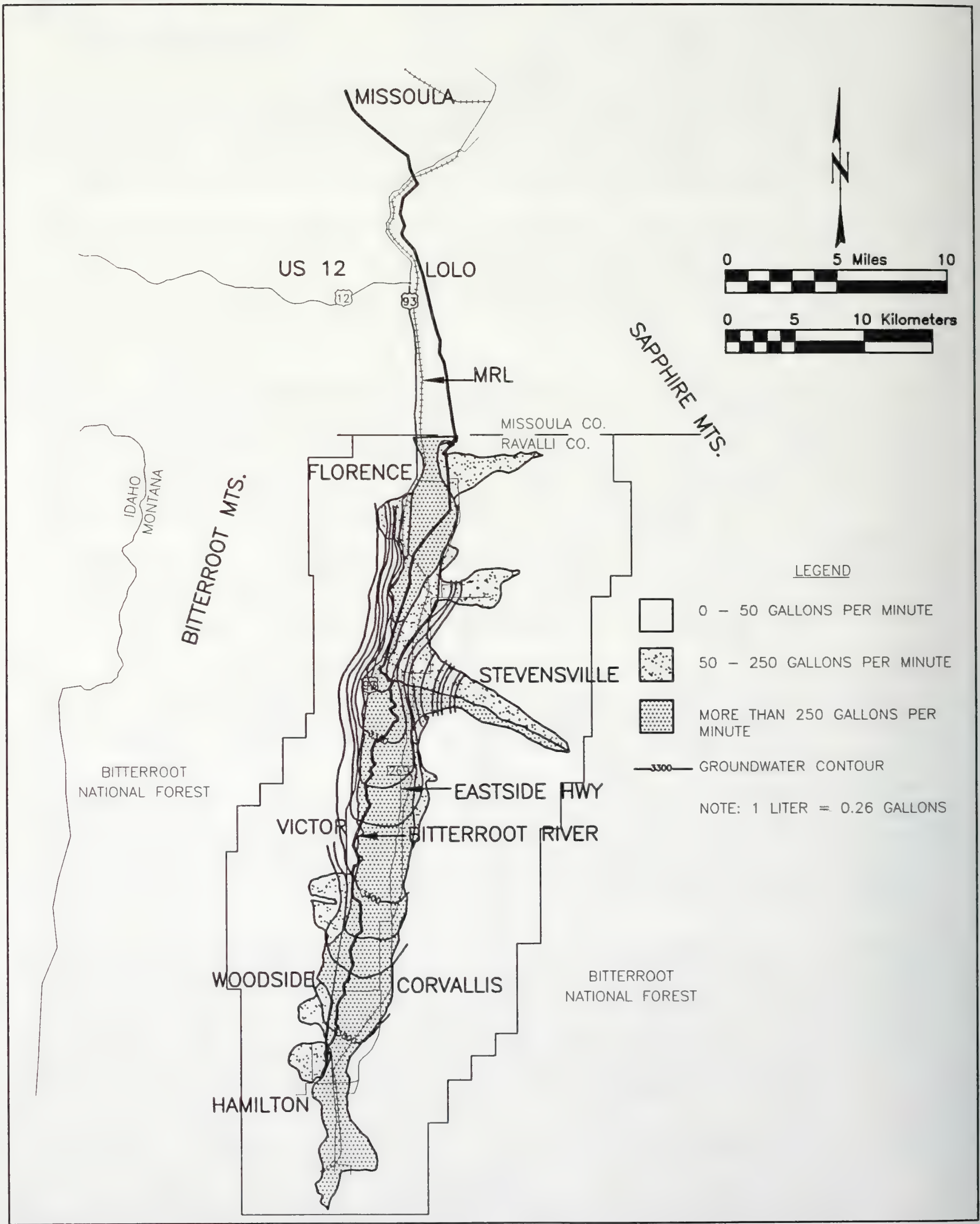


FIGURE 3-2
GROUNDWATER CONTOUR MAP



SCS soil survey information along the corridor, indicates an average springtime water table depth of 2.4 m (8 ft) or greater can be expected. Studies have indicated a seasonal groundwater fluctuation of an additional 2.4 m (8 ft), which drops the average groundwater table to a depth of approximately 4.9 m (16 ft) during the late fall and winter months.

The vast majority of the soils in the project area consist of alluvial deposits (sands and gravels). Groundwater transmissibility (flowrate through the soil) will vary from 9.1 lpd to 1060 klpd (2400 to 280,000 gpd) per foot depending on the sorting of the alluvial soils; the coarser the material the higher the flowrate.

The groundwater is recharged by leakage from irrigation canals, percolation of irrigation water, precipitation, and stream flow. In several areas of cut excavation along the existing roadway, the groundwater has been observed to seep out of the shallow formation and present a problem for drainage and road stability. In other areas the close proximity of groundwaters to the existing ground surface will also create concern for proper foundation treatments for any "build" alternatives that may be implemented.

Despite the abundance of groundwater in the area, it has not been designated as a sole source aquifer for protection under EPA guidelines. However, EPA's Wellhead Protection Program does require some protection of groundwater sources to help preserve the groundwater quality.

Water Quality: A Water Quality Report[1] was compiled that indicated the quality of the surface waters in the project area is generally good. All surface waters within the project corridor have been classified as B-1 by the Montana Water Quality Division (MWQD). These waters are suitable for drinking, culinary use, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply.

The surface waters typically have moderate concentrations of dissolved minerals and high concentrations of dissolved oxygen. Suspended particulates and turbidity increase significantly during spring runoff and after major precipitation events. This is due to erosion of stream banks and other riparian areas; thus temporarily adding large volumes of sediment to the water.

Heavy metals and excessive salts are generally absent from the surface waters. Eutrophication (stagnation caused by heavy nutrient load and lack of oxygen) is generally not a problem since low concentrations of nutrients (such as phosphorus and nitrogen) limit the growth of aquatic plants and keep the amount of biologic matter relatively low. Some localized exceptions to this occur in areas near population centers where discharge from wastewater treatment plants or high concentrations of septic tanks locally increase the nutrient load until greater dilution is achieved downstream.

Groundwater quality is generally very good with moderate concentrations of dissolved minerals leached from the rock formations and alluvial deposits through which the groundwater migrates. Groundwater throughout the study corridor is classified as A-1, which is generally suitable with little or no treatment for public and private water supplies; culinary and food processing purposes; irrigation; livestock and wildlife watering; and for commercial and industrial purposes.

EPA's Wellhead Protection regulations require protection of wellhead areas by separation from direct impact by human and agricultural uses. Some groundwater monitoring wells have been installed by MDT in the Florence to Lolo section of the study corridor. The purpose of the wells is to monitor existing groundwater conditions, including water levels and seasonal variations. Monitoring of the wells is providing baseline data that can be used to more accurately predict potential impacts to groundwater associated with any proposed improvements.

Navigable Waters: There are no federally designated navigable waters in or near the project area, however the Bitterroot River is listed as a State navigable stream by the Montana Department of Natural Resources

Conservation (DNRC). This will require a State land use license (see Section 4.24) from the DNRC for the crossings of this stream.

Wild and Scenic Rivers: Wild and scenic rivers are those prime or pristine river areas designated by Congress to receive special protection from development, encroachment or adverse impacts that would detract from their natural appeal and setting. Although the Bitterroot Valley is noted for its scenery and appeal of the natural setting, none of the surface waters within or near the study corridor have been designated as "wild and scenic", nor are any known to be proposed for such protection in the near future.

3.3 FLOODPLAINS

Federal Highway Administration Floodplain Regulations establish standards for cost effective designs of highways in floodplains. The regulations are consistent with the National Flood Insurance Program standard that allows up to a one foot increase in flood stages for encroachments into a designated floodway for a flow of a certain volume.

Generally, floodplains are found in the vicinity of surface waters (streams and lakes). The Federal Emergency Management Agency (FEMA) has conducted studies and published flood insurance rate maps that delineate the floodplains in the Bitterroot Valley. Table 3-1 and Figure 3-3 present the floodplains identified in a Floodplain Study[2] of the project corridor.

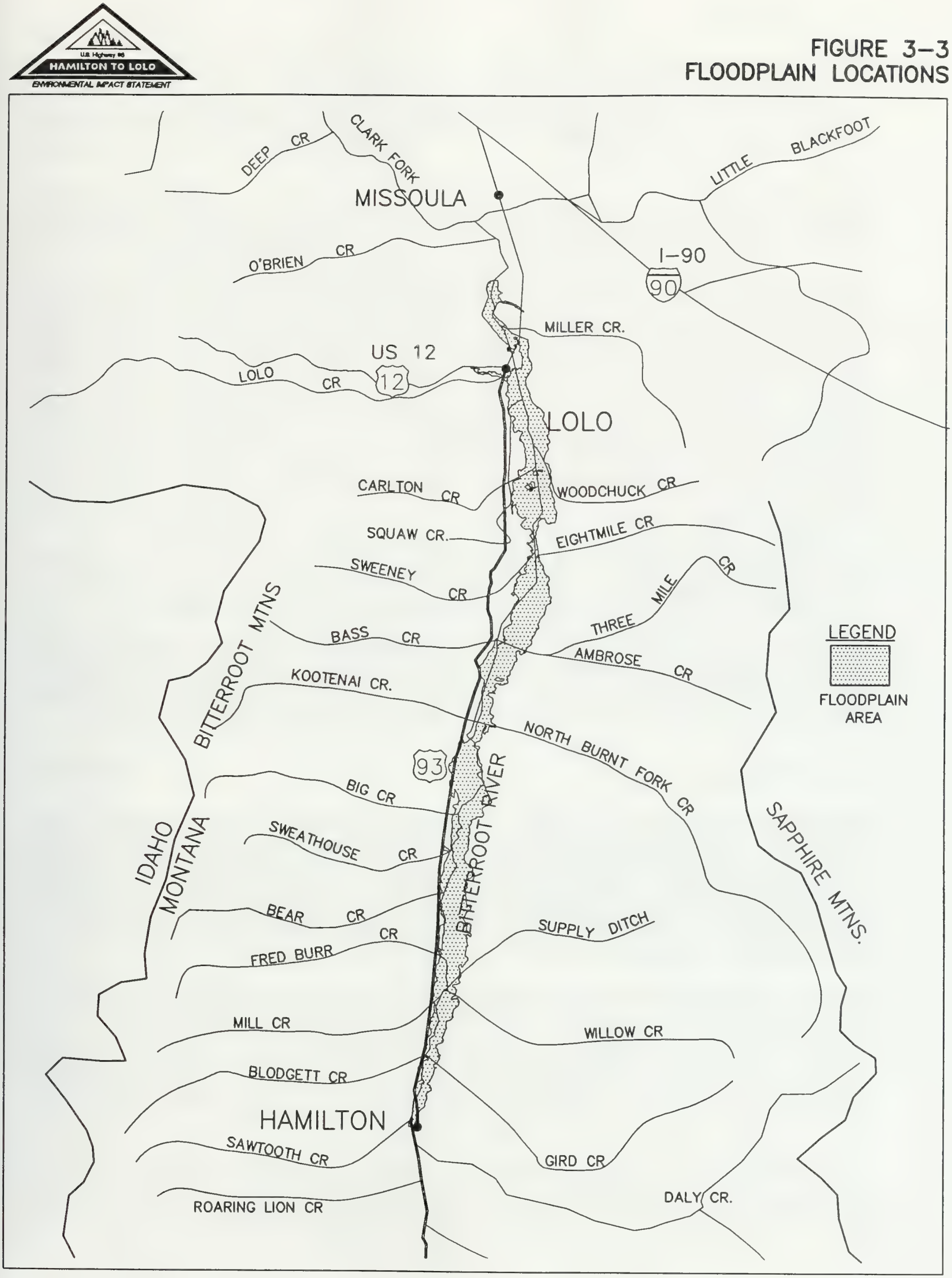
TABLE 3-1
FLOODPLAIN LOCATIONS

Milepost			Milepost		
To	**From**	**Drainage Name**	**To**	**From**	**Drainage Name**
49.5	51.0	F Burr Creek	63.8	65.1	Bitterroot River
51.5	51.7	F Burr Creek	65.1	65.9	Bitterroot River
54.5	54.6	F Burr Creek	65.9	66.2	Bitterroot River
54.6	55.0	Big Creek	69.2	69.7	Bitterroot River
55.0	55.1	Big Creek	70.4	71.1	Bass Creek
55.7	56.1	Big Creek	76.6	76.9	County Line
61.5	61.6	Big Creek	82.9	83.0	Lolo Creek
63.4	63.4	Bitterroot River			

Floodplains are categorized by the statistical frequency with which they are expected to be flooded. For example, an area defined as a 100-year floodplain is the area the water level would be expected to rise to for a flood statistically expected to occur only once in every 100 years. The limits shown in Figure 3-3 correspond to the 100-year floodplain areas. Floodplain regulations require that any potential improvements do not cause a 100-year flood elevation more than 0.3 m (1 ft) higher than the elevations projected on the existing flood insurance rate maps published by FEMA.

The regulations also establish what is know as a regulatory floodway. This is a preserved area within floodplain boundaries that is designated to help handle expected flood flows that frequent a given stream. To preserve this capacity, encroachments into regulatory floodways are not allowed at all. There are no designated floodways in the study area.

FIGURE 3-3
FLOODPLAIN LOCATIONS



Encroachments of improvements upon the floodplains are classified as either longitudinal (running parallel to the creek or river creating the floodplain) or transverse (crossing the floodplain at a right angle). FHWA floodplain regulations require avoiding longitudinal encroachments wherever practicable and that transverse encroachments be supported by analyses of design alternatives with consideration given to capital costs, risks, and other site specific factors.

Through the length of the study corridor the existing roadway encroaches both transversely and longitudinally on several different floodplains delineated on the FEMA maps. The study that was conducted contains specific information regarding encroachment into the floodplain areas by the existing highway.

The most notable existing encroachment, and the one that will require closest attention in evaluating impacts, is the crossing of the Bitterroot River just north of Hamilton. The present alignment constitutes a transverse encroachment on the 490 m (1600 ft) wide floodplain at this location. Presently there is a 120 m (392 ft) truss bridge with embankments for the approaches covering the remainder of the floodplain at this crossing. The greatest evidence of the inadequacy of the existing crossing is the 1 m (3 ft) elevation difference existing between the upstream and downstream base flood elevations for the water surface at this crossing. This is verified by the scour hole existing under the structure and the formation of gravel bars (deposition) in the wider reaches of the river downstream from the crossing location.

Proper evaluation of potential floodplain impacts requires investigation for:

- increased backwater upstream
- increases in velocity upstream and through the proposed bridge or culvert opening
- effect on channel stability upstream and downstream
- increased risks to property and existing facilities
- verification of the delineated floodplain and any future delineated regulatory floodway

Additional or new encroachments in the floodplain areas will require concurrence from FEMA and the local government agency charged with regulating the floodplain (the counties or incorporated cities). Concurrence is noted by the issuance of specific permits, only after it has clearly been demonstrated that excessive backwaters, stream stability, and risks to property damage are negligible or within acceptable limits.

3.4 AIR QUALITY

Air quality can be measured by determining concentrations of contaminates in the atmosphere. Ambient concentrations of contaminants depend on local terrain, climatic conditions, and quantities of air pollutants emitted from various sources. Medical studies have shown that excessive concentrations of air pollutants can affect human health and welfare. An Air Quality Report[3] was conducted within the study corridor to qualitatively analyze emissions of carbon monoxide (CO) suspended particulates (PM_{10}), which are air pollutants associated with dust and the burning of hydrocarbons such as gasoline, wood (wood burning stove), coal, etc.

Standards and Regulations: Applicable air quality standards and regulations provide a basis for evaluating potential impacts and mitigation measures. Air quality in the project area is regulated by the US EPA and the Montana Air Quality Division (MAQD). Under the Federal "Clean Air Act", the EPA has established National Ambient Air Quality Standards (NAAQS), which specify maximum concentrations for airborne pollutants. Maximum limits are identified for CO, PM_{10}, ozone, sulphur dioxide, lead, and nitrogen dioxide. The eight (8) hour CO standard of 9 parts per million is the NAAQS standard most likely to be exceeded as the result of transportation improvements involving internal combustion vehicles.

Certain geographical regions where area pollutant concentrations seasonally or consistently violate the NAAQS are designated as "non-attainment" areas. Such areas receive special attention and mitigation efforts in order to improve the chances of achieving the recommended standards.

The Missoula metropolitan area (beginning approximately 3.1 to 3.7 km (5 to 6 mi) north of the project area) is currently recognized as a non-attainment area for CO and PM_{10}. All other pollutants in that area are below the NAAQS. In the Hamilton to Lolo study corridor, all pollutant levels are below the NAAQS. Since the project area is in attainment and the only potential concerns are CO and PM_{10}, only a qualitative analysis of existing air quality was addressed by the study.

Existing Air Quality: Currently there are two air quality monitoring stations reasonably close to the project corridor. The first is a continuous PM_{10} monitor operated by the Forest Service in Stevensville (approximately 1.6 km [1 mi] east of US 93). The second is a manual daily monitor located just off of US 93 in downtown Hamilton. Unfortunately, both stations were just recently installed (Fall 1995) and not enough data has been generated to identify any basic trends. Two items of note from the data developed to-date are first, PM_{10} concentrations are higher in this developed corridor than at a monitor in a remote area of the West Fork of the Bitterroot (approximately 80 km [50 mi] southwest), and secondly that the PM_{10} levels recorded to-date are all well below the NAAQS. As expected, the continuous monitor in Stevensville does indicate some hourly increases in PM_{10} concentrations that appear to be associated with commuter traffic increases.

Main sources of air pollutants are vehicular traffic on area roadways and smoke from wood burning stoves as a heat source in the winter. Sources of PM_{10} are winter sand material that accumulates on the roadway, unpaved streets and parking lots that access the highway, and particulates associated with wood smoke. PM_{10} is usually high in the area in the early spring between the time of the melting of the last snow and removing of the winter sand material. Concentrations of PM_{10} are also higher in the winter near densely populated areas (Missoula and Hamilton) as a result of wood smoke from home stoves and fireplaces.

Since the project corridor is distant from major pollution sources and since land uses in the study corridor are predominately rural, concentrations of CO are expected to be low. Increases in CO are noted during winter temperature inversion in the Valley when warmer air above traps cooler air at the surface and acts as an atmospheric "lid"; thus producing stable conditions with little vertical mixing of air by wind action. These temperature inversions are often the source of non-attainment in the Missoula metropolitan area for both CO and PM_{10}. Although visual degradation of air quality in the project corridor is seasonally evident, concentrations of contaminants in the atmosphere have consistently remained below the NAAQS recommended levels.

3.5 NOISE

Sound is the result of pressure waves created from objects being set into vibration. The range of magnitude from the faintest to loudest sounds humans can hear is so large that sound pressure is expressed on a logarithmic scale in units calls decibels (dB). Under the logarithmic dB scale, two noise sources each omitting a noise level of 60 dB combine together to yield a noise level of 63 dB (not 2 x 60 = 120 as one might expect). To simulate how humans hear various frequencies of sound, the overall frequency spectrum is measured as A-Weighted dB (dBA). These are physical sound measurements (of pressure waves) that can be made with sensitive instrumentation. Loudness, on the other hand, refers to how individual humans subjectively judge a sound.

Noise levels from traffic depend on several factors including:

- volume
- speed
- percentage of trucks
- topography
- vegetation
- distance from the roadway to the receptor

Generally, an increase in volume or speed will increase traffic noise levels. Distance is an important factor as noise levels diminish rapidly with increasing distance from the source. For example, noise levels from a

line source such as roadway traffic will decrease 3 dBA over hard ground (concrete or pavement) for every doubling of distance between the roadway and the receptor. The decrease increases to 4.5 dBA over soft ground (grass or vegetation). For a point source such as stationary construction equipment, noise levels will decrease 6 dBA for every doubling of distance.

Noise Standards: Environmental noise is commonly expressed as the equivalent sound level (L_{eq}), which can be considered the average noise level. L_{eq} places more emphasis on occasional high noise levels that accompany and exceed general background noise levels. L_{eq} measured over a one hour period is the hourly L_{eq} ($L_{eq(h)}$), which is the standard the Federal Highway Administration (FHwA) uses for roadway noise impact and reduction analyses. Related levels of noise impact measurement are defined as follows:

- L_{max} - the instantaneous maximum noise level that can occur during any period of time. Usually a single event of short duration.
- L_{min} - minimum sound level during a period of time.
- L_{10} - sound level that is exceeded only 10% of the time.

Applicable noise regulations and guidelines provide a basis for evaluating noise impacts. For federally funded transportation improvement projects, traffic noise impacts occur when predicted $L_{eq(h)}$ noise levels approach or exceed noise abatement criteria established by FHWA or substantially exceed the existing noise levels for a given facility. MDT considers an increase of 10 dBA or greater above the existing noise level to be a substantial increase; thus defining the point where noise impacts begin to occur.

The FHWA noise abatement criteria for residences, parks, schools, churches, and other similar areas is 67 dBA. MDT considers a noise impact to occur if predicted $L_{eq(h)}$ noise levels approach within 1 dBA of the noise abatement criteria, which in this case would be 66 dBA for residential areas.

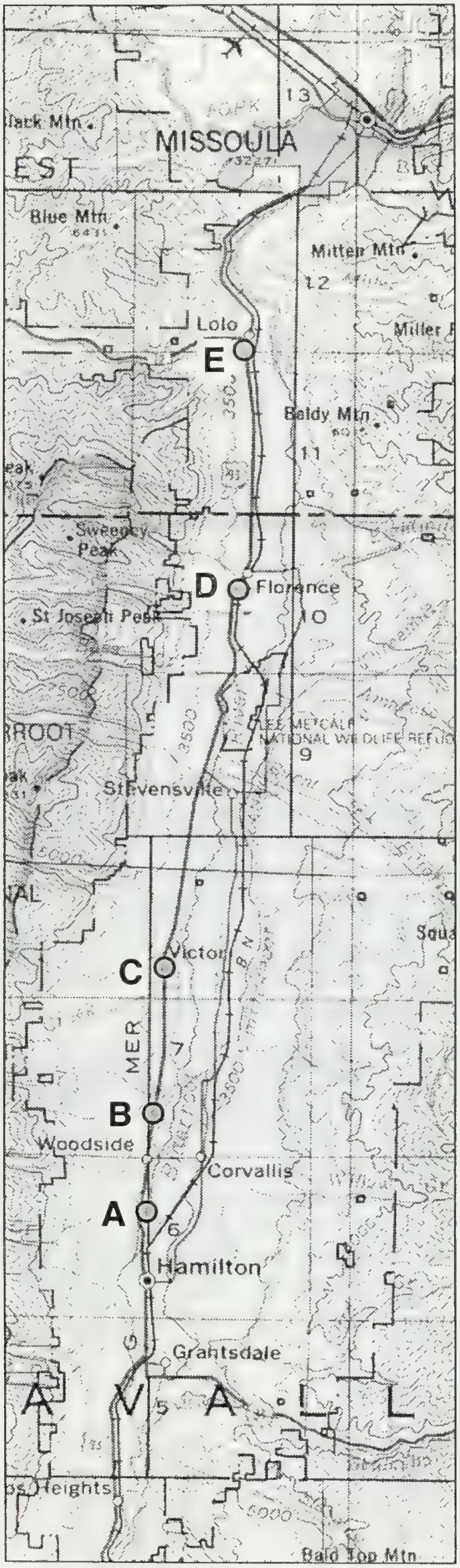
Ambient Noise Levels: A Noise Study[4] was conducted in the project corridor to determine the existing noise levels. These noise levels were measured to describe the existing noise environment and to identify major noise sources in the project area. Noise levels were measured at five locations in the project corridor between 7 a.m. to 6 p.m. on a weekday in order to characterize weekday morning and afternoon peak hour noise levels. Figure 3-4 shows the locations where noise measurements were taken and Table 3-2 presents the results of this noise monitoring.

TABLE 3-2
STUDY CORRIDOR NOISE MEASUREMENTS

Receptor #	Location	Distance to US 93 m (ft)	Date	Time	A-Weight Decibels (dBA)				Comments
					L_{eq}	L_{max}	L_{min}	L_{10}	
A	Blodgett Park	35 (115)	10/8/92 10/9/92	3:07-3:22 p.m. 5:13-5:28 p.m.	65 66	76 82	44 46	68 69	
B	Woodside Mobile Homes	24 (80)	10/9/92	4:21-4:36 p.m.	65	83	43	69	Aircraft flyover, construction in distance
C	Victor Victor Park	64 (210)	10/9/92 10/8/92	12:00 noon 4:00 p.m.	52 54	64 68	42 43	--- ---	Noise from traffic on residential streets was present, but not included in sample
D	Florence 415 Florence S Loop	95 (310)	10/9/92 10/9/92	7:59-8:14 a.m. 10:49-11:04 a.m.	59 44	70 59	45 35	63 48	
E	Lolo Delarka Drive, Bitterroot Meadows Subdivision	55 (180)	10/9/92 10/8/92	7:06-7:21 a.m. 5:47-6:02 p.m.	59 60	77 73	38 40	61 63	

U.S. Highway 93
HAMILTON TO LOLO
ENVIRONMENTAL IMPACT STATEMENT

FIGURE 3-4
NOISE MEASUREMENT LOCATIONS



LEGEND:

A ● Noise Measurement Location

N

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The noise measurement locations were selected where traffic noise from US 93 is dominant and these locations are thus representative of other sensitive receptors within the corridor. The dominant source of noise measured during sampling was from automobile and truck traffic on US 93. Other noise sources include aircraft flyovers, traffic on residential streets within the communities, trains on the Montana Raillink line, and construction activities.

As shown in Table 3-2, measured L_{eq} noise levels in the corridor ranged from 44 to 66 dBA at measurement distances from 95 m (310 ft) to 24 m (80 ft), respectively from the centerline of existing highway.

None of the noise measurements exceeded the FHWA noise abatement criteria of 67 dBA for residential areas, although the one measurement of 66 dBA at Receptor A (north of Hamilton) approaches the 67 dBA criterion. As expected, the measured noise levels were higher during the morning and evening peak hours of traffic than during mid-day.

Critical Receptors: The five locations selected for noise measurements are examples of critical receptors for noise within the project corridor. Other locations similar to these in condition and proximity to the highway can expect similar existing noise levels and potential impacts (discussed in Section 4.5).

Receptor A is a picnic area on the east side of US 93 north of Hamilton (Blodgett Park). Measured L_{eq} noise levels ranged from 65 to 66 dBA. This receptor was selected to characterize existing noise levels outside of Hamilton near the southern end of the study area. The measured L_{eq} noise level of 66 dBA at this receptor during the evening peak hour was the only noise level measurement at any location that approached the FHWA noise abatement criterion of 67 dBA.

Receptor B is located near several mobile homes in the north part of Woodside area. The measured L_{eq} noise level was 65 dBA. This higher level is likely due to higher operating speeds and greater volumes of traffic on this stretch of highway. Approximately 10 business and single family residences are located near this receptor.

Receptor C is located in Victor Park within the community of Victor. Measured L_{eq} noise levels were 52 and 54 dBA with the higher noise occurring during the evening peak hour. Measurements taken were strictly of traffic on US 93 and specific efforts were made to exclude noise from local side streets and parking lots near the receptor. Therefore, actual ambient noise levels would likely be higher than those measured. Noise levels at this receptor were the lowest of all sampling sites predominantly due to the lower traffic speeds on the highway within the Victor limits and also since strip commercial development along the highway partially shields noise from the roadway to the park, which is about ½ block west of the highway.

Receptor D is also an area of single family houses, this one being located south of Florence. The measured L_{eq} noise level of 59 dBA during the morning peak hour was significantly higher than the 44 dBA during mid-morning, which substantiates that higher noise levels along the corridor occur during the peak hours of traffic.

Receptor E is the Bitterroot Meadows Subdivision south of Lolo. Measured L_{eq} noise levels were 59 and 60 dBA and showed little variation between morning and evening peak hours. The Bitterroot Meadows Subdivision is a relatively new housing development with existing houses, several under construction, and additional lots available for future development. Approximately 20 single family residences are located at this receptor and this location was selected to characterize existing noise levels at Lolo near the north end of the project area.

3.6 HAZARDOUS MATERIALS

A Hazardous Material Assessment[5] of the study corridor was conducted to determine the potential environmental risks associated with these materials in the study corridor. Identification of potential problem

areas allows careful development and evaluation of improvement alternatives to reduce or eliminate impacts or risks associated with hazardous materials. Materials of concern include:

- petroleum products (hydrocarbons)
- toxic chemicals or substances
- insecticides, fungicides, and rodentcides
- solid wastes
- underground storage tanks
- heavy metals
- wood preservatives
- pH (acidity or alkalinity)

Study Methodology: The effort to identify potential hazardous material sources included extensive field observation along with a thorough research of historical information. The following elements represent the work accomplished:

- Reviewing available historical information to identify previous activities that occurred along the highway corridor that may have involved the use and/or release of hazardous materials, especially petroleum products.

- Reviewing available public records including federal, state, county, and municipal information concerning environmental issues, property ownership records, and underground storage tank records.

- Interviewing available residents, public officials, and representatives of regulatory agencies to inquire about possible past or present environmental concerns within the corridor.

- Conducting a site reconnaissance to observe current conditions and/or evidence of past hazardous material usage along the highway corridor.

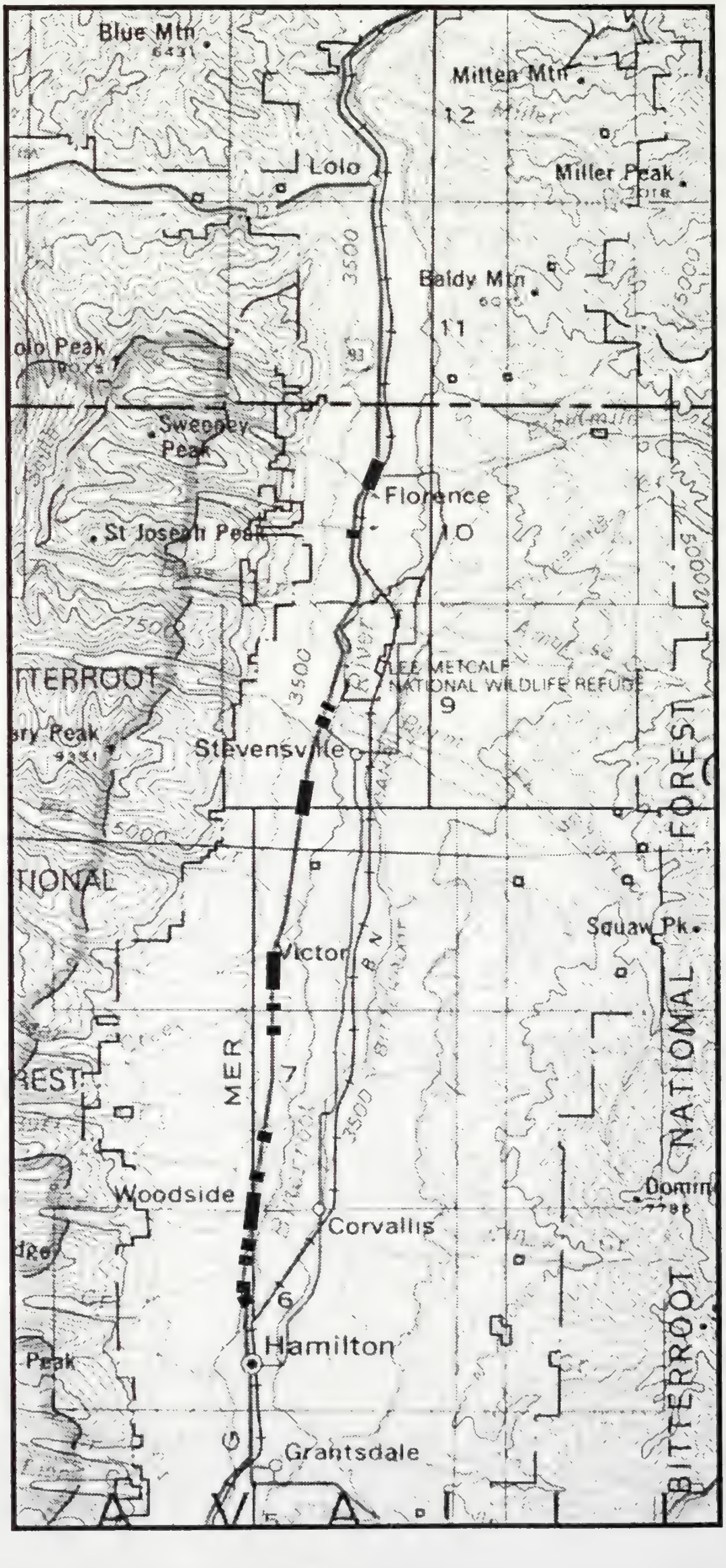
- Preparing a project report presenting the methods and findings of the hazardous material assessment.

No subsurface exploration, sampling, or analytical testing was performed during the Hazardous Materials Assessment.

Hazardous Materials Assessment: The full hazardous materials assessment study, which specifically identifies potential hazardous materials areas, has been completed and is on file with MDT and appropriate regulatory agencies. Figure 3-5 shows areas within the study corridor where hazardous materials are known or have the potential to be present. A general review of the assessment findings results in potential sources of hazardous materials as follows:

- presumed use of chemicals or hydrocarbons - 37 locations
- underground storage tanks, above ground storage tanks, or remnants of bulk fuel operations - 29 locations
- presence of nitrates - 5 locations
- chemical or hydrocarbon storage drums - 12 locations
- evidence or historical reference of spills - 7 locations
- dump areas (including sanitary refuse) - 3 locations
- use of wood preservatives - 9 locations

FIGURE 3-5
POTENTIAL HAZARDOUS MATERIAL LOCATIONS



Area of environmental concern for hazardous materials

Table 3-3 illustrates the general distribution of these potential sources within the project corridor. To clarify, Figure 3-5 showed areas of concern within the corridor whereas other areas shown in Table 3-3 and not in the figure are considered to be low risk.

TABLE 3-3
POTENTIAL HAZARDOUS MATERIALS

Location	Chemicals or Hydrocarbons	Storage Tanks	Nitrates	Storage Drums	Spills	Dump Areas	Wood Preservatives	PCB
49.0 - 50.0	X		X	X				
50.0 - 52.4	X	X	X	X	X			
52.4 -53.0								
53.0 - 56.0	X	X		X				
56.0 - 57.0								
57.0 - 58.0	X			X	X	X	X	
58.0 - 59.0								
59.0 - 60.0	X	X						
60.0 - 65.0	X						X	
65.0 - 66.0								
66.0 - 67.0	X		X		X			
67.0 - 73.0								
73.0 - 74.0	X	X						
74.0 - 75.0	X	X			X			X
75.0 - 76.0	X			X				
76.0 - 82.0						X		
82.0 - 82.3	X	X			X			

3.7 VISUAL / AESTHETICS

The Bitterroot Valley is noted for its scenic appeal. The Valley is essentially bounded by the Bitterroot Range on the west and the Sapphire Mountains on the east. Views of the river, mountains, forested areas, and large tracts of open land create enough appeal that many residents were initially attracted to the area by the inherent beauty and many tourists plan to travel through the area for its scenic beauty. More specific indication of the visual qualities in the project corridor is given in the subsections that follow.

Background Landscape: The background landscape in the project corridor is principally associated with major geologic features. The three primary elements within the corridor include:

- Bitterroot Mountains - This mountain range parallels the project corridor on the west side. The peaks are quite rugged, having been glaciated and rise to an elevation of 3050 m (10,000 ft) to form the continental divide and the physical boundary between Montana and Idaho. The project corridor lies at the foot of these mountains, traversing the broad alluvial terraces and finger ridges created by the prehistoric glaciation, erosion, and weathering of this mountain range. The eastward facing slopes (visible from roadway) are densely forested with species of pine trees. The vegetation thins near the peaks where grey, rocky crags and cliffs form a stark contrast against the deep green of the forest.

- Sapphire Mountains - These mountains basically parallel the corridor on the east side of the Valley. These mountains are somewhat lower than the Bitterroots and are given more to rolling than to steep terrain. More thorough erosion and glacial action has reduced these mountains to more rounded hills with larger open areas on the westward facing slopes. However, there are also significant forested areas with characteristics similar to those on the east slopes of the Bitterroots. Like the Bitterroots, the front of the mountain range contains numerous drainages and canyons feeding down into the Bitterroot River.

- Bitterroot River - Typical of rivers in mountainous areas, the Bitterroot River flows over gravel and cobble deposits on the Valley floor in a slightly meandering pattern with numerous braided channels. The variation in channel bottom materials and width creates alternating series of deep pools and shallow rapids. During flood stages, the river is aggressively cutting new channels and filling old ones in addition to efforts to meander further by eroding and cutting banks where directional changes of flow occur.

Foreground Landscape: The foreground visual resources are those most immediately visible within the corridor. These are predominantly associated with the local land uses and human development of the corridor. Foreground landscape units include:

- Riparian - The existing alignment crosses numerous small streams feeding the Bitterroot River. Additionally, the river itself parallels the project corridor and in some cases is in close enough proximity to be immediately adjacent to the existing alignment. The characteristics of riparian areas are trees, shrubs, and deciduous vegetation along the streambanks varying in density according to terrain and character of the underlying soils.

- Forest - Some areas of forest extend down off the Bitterroot Mountains across the terraces and into the Bitterroot River drainage. Predominantly these forested areas follow undeveloped land associated with water courses or where the terrain or character of the soil has made it difficult to try and utilize the land for agricultural purposes. These forested areas are predominantly coniferous (pine) with some deciduous (leafy) vegetation in the undergrowth and perimeter areas.

- Agricultural - The predominant landscapes in the project corridor are large open spaces presently or formerly used for agricultural purposes. The terrain is generally flat to rolling presenting both pasture and crop land areas. The open nature of the foreground agricultural landscape units combines nicely with the background landscape units to enhance the visual perspective and improve the overall aesthetic appeal of the corridor.

- Residential - Clusters of residential development exist throughout the corridor and sparsely located residential development is associated with many of the open agricultural areas. Near the urbanized areas, the density of this residential development tends to increase consistent with the nature of the urban development. Resources of the residential landscape units are the character and variety of the homes, associated landscaping, and improvements such as streets, park areas, etc.

- Urban - Although not presenting "big city" appearance, each of the small communities or major intersection areas along the project corridor have developed into small urban centers presenting commercial, business, and residential development in close proximity to the highway alignment. A considerable amount of this development is "strip" in nature, being spread out in a thin ribbon along each side the existing highway. Visual characteristics include commercial buildings, store signs, parking areas, driveways, and accesses along with some limited areas of landscaping or occasional undeveloped space.

- Industrial - These foreground landscape areas are characterized by larger buildings, large commercial operations, storage areas, etc. Typical examples include sand and gravel pits, concrete batch plants, log home assembly and storage yards, sawmills, storage units, and small manufacturing facilities.

These developments tend to be concentrated near the urban areas; although the absence of land use controls in the past has allowed their occurrence almost at random in any given area of the corridor.

The above described landscape units occur with regularity and variety throughout the project corridor. Table 3-4 briefly summarizes these visual resources as they occur when traveling through the corridor.

View from Roadway: Views from the road are those seen principally by the users of the highway; motorists, bicyclists, pedestrians, tourists, etc. The character and quality of these views change as the foreground and background landscape units become more or less prominent. Table 3-4 gives a good indication of what these views would be for various locations along the corridor.

Typically speaking, views from the roadway and their relative value are as follows:

- urbanized and industrial areas - poor
- residential areas - poor to moderate
- riparian and forested areas - moderate to good
- agricultural areas - moderate to excellent

TABLE 3-4
VISUAL RESOURCES

Milepost		Foreground Landscape						Background Landscape		
From	To	Riparian	Forest	Agricultural	Residential	Urban	Industrial	Bitterroot Mountains	Sapphire Mountains	Bitterroot River
49.0	49.3					X	X	X	X	
49.3	49.9	X		X			X	X	X	X
49.9	50.6	X		X	X			X		X
50.6	51.9			X				X	X	
51.9	53.2			X		X	X	X		
53.2	55.8			X				X	X	
55.8	59.0	X		X	X			X	X	
59.0	59.5				X	X				
59.5	63.0			X	X			X	X	
63.0	66.5	X	X		X			X	X	
66.5	69.4			X	X			X	X	
69.4	71.0	X	X							X
71.0	72.5			X	X			X	X	
72.5	73.0		X		X					
73.0	74.0			X	X			X	X	
74.0	75.8					X			X	
75.8	82.7			X	X			X	X	
82.7	83.0	X	X							
83.0	83.1					X		X	X	

Excellent views from the roadway are those predominantly associated with wide open spaces where the foreground units simply enhance but do not distract from the grandeur of the background units.

Additional considerations are the seasonal changes of the view from the roadway. Autumn colors are vivid and vary principally within the deciduous components of the riparian and forest border areas. Winter snow on the mountain peaks lasting into the spring and early summer provides a vivid visual associated with the

background landscape. Similarly, winter storms and summer rain showers often obscure or accentuate the mountain peaks, providing additional contrast.

View of the Roadway: A view of the roadway is provided to highway users and those who live along the highway within the corridor. Views of the roadway are low to moderate for those areas associated with existing development, particularly where large buildings or other development obscure the view. Areas where there is vertical relief to the roadway grade (e.g. Bass Creek Hill) or other areas where there are long sweeping horizontal curves in the roadway provide a nice view of the roadway contrasted against the foreground and background landscape units. Similar to the discussion in the foregoing section, views of the roadway are best in open, undeveloped, natural settings and poorest where there is intense urban or industrial development, particularly in "strip growth" areas.

B. BIOLOGICAL ENVIRONMENT

3.8 VEGETATION

A Biological Resources Report[6] was conducted that inventories the terrestrial and aquatic resources within the project corridor. The Valley is characterized as a mosaic of agricultural lands, ranches, wetlands, the Bitterroot River and associated riparian communities, knapweed expanses, and urbanization. Residential and commercial developments are increasing and intruding into vegetative areas. Although specific detailed information on vegetation can be found in the report, general descriptive information is presented here for background purposes.

Types of Vegetation: General vegetative areas within the project corridor can be summarized as follows:

- Disturbed and Roadside Areas - This type is one of the more frequently encountered areas in the corridor and is found predominantly adjacent to the existing roadway. Knapweed, thistle, bluegrass, quack grass, and other introduced species dominate the composition.

- Wetlands - Another frequently encountered type is the wetland areas found throughout the project corridor. A variety of wetland types are present providing a range in diversity of vegetative and structural components. Open water, herbaceous/shrub, and herbaceous borrow ditch wetlands are frequently encountered. Vegetation in these areas predominantly consists of hydrophytic species coinciding with hydric soils.

- Riparian - These areas are found adjacent to creeks, rivers, wetlands, and other water sources. Dominant vegetation includes cottonwoods, willows, red-osier dogwood, and miscellaneous graminoids, forbs, and shrubs.

- Coniferous - The coniferous forest types, some of the less common types present, are located primarily as stringers or bands connecting the uplands and riparian habitats. This dry coniferous habitat is dominated by ponderosa pine with an understory of species such as redtop, rose, snowberry, and serviceberry.

- Cultivated/Pastures - Cultivated fields and pastures are found throughout the project area in varying amounts. These consist primarily of hayfields and pasture lands of alfalfa, bromes, and other cultivated crops.

- Residential - These types are found throughout the project corridor in varying amounts. The vegetation associated with these areas predominantly consists of grasses, shrubs, and small trees associated with the landscaped areas.

Sensitive Plants: Sensitive plants are those susceptible or responsive to external conditions or stimulations to the point where they are easily damaged or upset by these outside influences. Their concern for population viability is evidenced by downward trends in numbers or density and current or predicted downward trends in habitat capability. The study reveals 15 plant species of special concern occur within five miles of the proposed project. Of these, five probably do not occur in the proposed project area due to lack of suitable habitat. The remaining ten could occur and nine of the ten are known to occur with one mile of existing Highway 93. Table 3-5 lists these rare plant species that may occur in the project area.

TABLE 3-5
RARE PLANT SPECIES

Species	Commonly Known As
athysanus pusillus	sand weed
cares scoparia	pointed broomsedge
centunculus minimus	chaffweed
cyperus rivularis	shining water sedge
cypridedium calceloulus var. parviflorum	small yellow lady's slipper
epilobium suffruticosum	shrubby willow-herb
mulenbergia minutissima	least muhly
myosotis verna	early forget-me-not
naja guadalupensis	guadalupe water nymph
trifolium microcephalum	woolly clover

The report indicated the possibility of 13 sensitive plant species as designated by the Forest Service may occur in the project area due to the presence of suitable habitat. The field review conducted did not document any sensitive plant populations. However, the limited area of inventory (adjacent to the existing highway) and timing of the field review may be factors in not discovering the expected plants.

Table 3-6 inventories the sensitive plant species anticipated within the project corridor.

TABLE 3-6
SENSITIVE PLANT SPECIES

Species	Commonly Known As
allium fibrillum	finged onion
athysanus pusillus	sand weed
botrychium paradoxum	peculian moonwort
clarkia rhomboidea	common clarkia
epipactis gigantea	giant helleborine
gentianopsis simplex	hiker's gentian
scirpus subterminalis	water clubrush
trifolium eriocephalum	woolly-head-clover
trifolium gynmocarpon	hollyleaf clover
grindelia howellii	howell's gumweed
potamogeton obtrusifolius	
scirpus cyperinus	wool grass

3.9 WETLANDS AND WATERS OF THE UNITED STATES

Wetlands are unique ecosystems that provide diverse and specialized habitats for wildlife. They are typically limited in extent, but are often extremely important for a variety of plant and animal species. Wetlands also are integral buffers between land and water-based ecosystems. Riparian and wetland habitats are those areas where vegetation is directly associated with rivers, streams, and other areas where soil saturation occurs. Wetlands are specifically defined by the US Army Corps of Engineers (COE) [40 CFR 230.3 1982] and the US Environmental Protection Agency (EPA) [33 CFR 328.3 1980] as:

> "Those areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Waters of the United States, which includes wetlands and other special aquatic sites, are protected and regulated under the Clean Water Act (CWA). Pursuant to Section 404 of the CWA, the COE has administrative authority to regulate the discharge of dredged and fill materials into these waters. Specific environmental characteristics of these areas, each of which has several indicators, include:

- hydrophytic vegetation; a prevalence of vegetation that has the ability to thrive and reproduce in saturated soil or flooded conditions without oxygen (anaerobic)

- hydric soils; soils that have developed primarily in a biochemically reducing (without oxygen) environment

- wetland hydrology; permanent or periodic inundation at water depths of 2 meters (6.5 ft) or less, or saturated soil to the surface at some time during the growing season of the prevalent vegetation

In addition to this legislative protection, riparian and wetland areas are protected by Executive Orders #11990 - Protection of Wetlands and #11988 - Floodplain Management, which control the actions of federal agencies in and around wetlands and floodplains, respectively. Protection is also provided by the Montana Water Quality Act. Numerous federal and state documents are available that provide further guidance for assessing wetland importance, potential impacts to wetlands, and mitigation of impacts.

A wetlands evaluation[7] was conducted in the study corridor to delineate and evaluate the wetlands resources that occur in the proposed project vicinity. The evaluation was conducted in accordance with federal and state legal and regulatory requirements following additional guidance for completion of the study provided by an Interagency Wetlands Group in Montana and the Montana Department of Transportation.

A corridor 158 m (520 ft) wide centered on the current centerline (except where alternate alignments were being considered) was studied to evaluate wetlands potentially impacted by the proposed actions. Surrounding areas were also investigated to identify contiguous and adjacent wetlands and riparian areas for habitat evaluation. Each of the areas were mapped in the field using Global Positioning Satellite (GPS) surveying methods to accurately calculate wetland acreage. The results were overlaid on aerial photographs as depicted by the seven pages of Figure 3-6. The US COE's 1987 method was used to delineate the wetlands and their classification. Wetland function and value evaluation followed the Montana Interagency Wetlands Group 1992 procedure.

Wetland Areas: The Bitterroot Valley and the study corridor are characterized by a mosaic of agricultural lands, ranches, wetlands, surface water courses, associated cottonwood riparian communities, knapweed expanses, and clusters of urban or residential development. After the initial crossing of the Bitterroot River at the beginning of the corridor, Highway 93 runs parallel to the Bitterroot River varying from 0.8 to 4.9 km (0.5 to 3.0 miles) to the west. Accordingly, the highway crosses numerous tributaries of the Bitterroot River and its associated riparian and wetland areas.

T. 11 N. T. 12 N.

LEGEND - WETLANDS DELINEATION

Discreet Wetland

Wetland Site

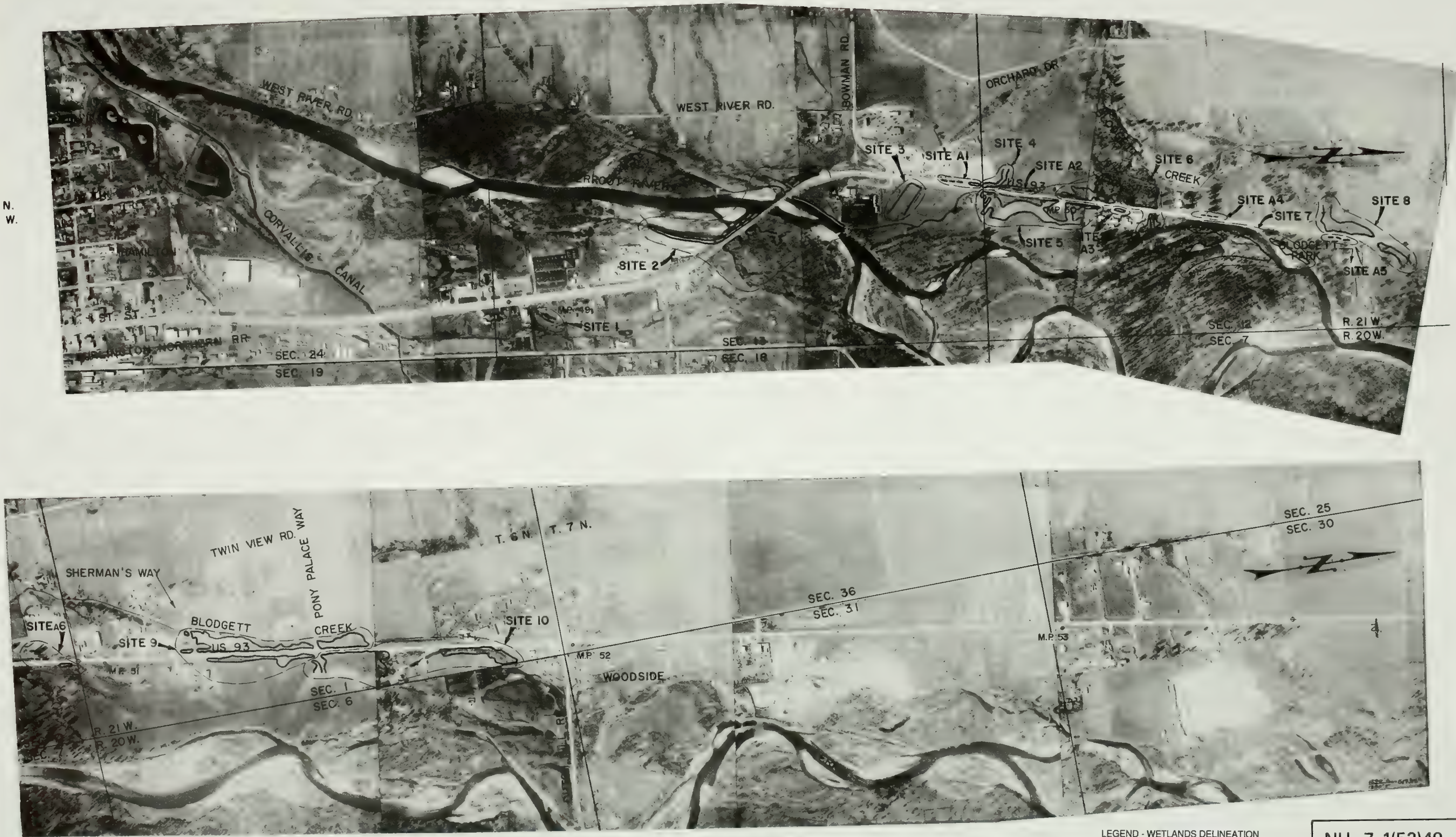
SITE 50

Study Corridor = 520-foot wide along existing centerline

OEA Research, Inc. PRH/ch April 1994

F 7-1(47)74
FLORENCE-LOLO
RAVALLI & MISSOULA
COUNTIES 9.7 MILES
SCALE 0 500 1000 1500
PHOTO DATE 4-1-91

T. 6 N.
R. 21 W.



LEGEND - WETLANDS DELINEATION

Discreet Wetland

Wetland Site

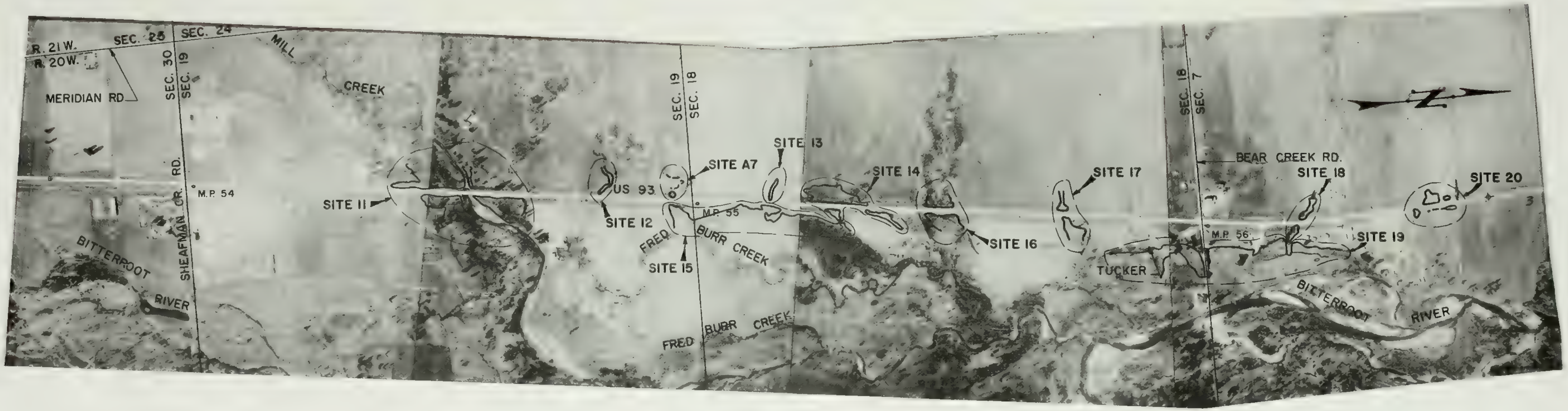
SITE 50

Study Corridor = 520-foot wide along existing centerline

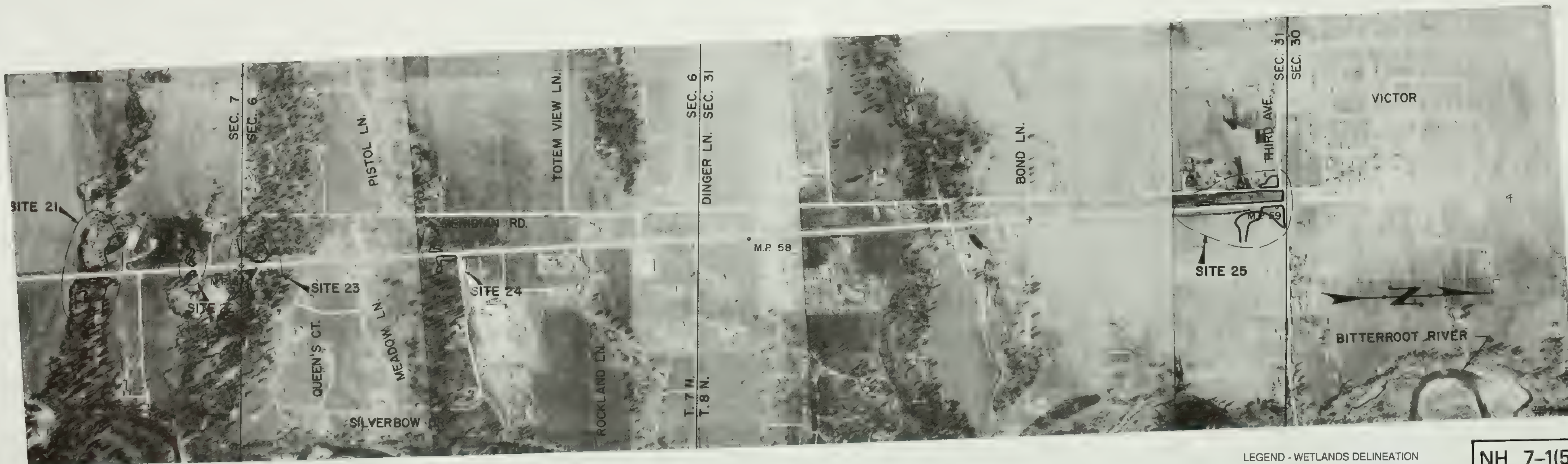
OEA Research, Inc PRH/ch April 1994

SHEET 1 of 2

NH 7-1(52)49
HAMILTON - VICTOR
RAVALLI COUNTY
9.67 MILES
SCALE 0 500 1000 1500
PHOTO DATE 3-9-92



T. 7 N.
R. 20 W.



LEGEND - WETLANDS DELINEATION

Discreet Wetland

Wetland Site

SITE 50

Study Corridor = 520-foot wide along existing centerline

OEA Research, Inc PRH/ch April 1994

NH 7-1(52)49 SHEET 2 of 2
HAMILTON - VICTOR
RAVALLI COUNTY
9.67 MILES
SCALE 0 500 1000 1500
PHOTO DATE 3-9-92

LEGEND - WETLANDS DELINEATION

Discreet Wetland

Wetland Site

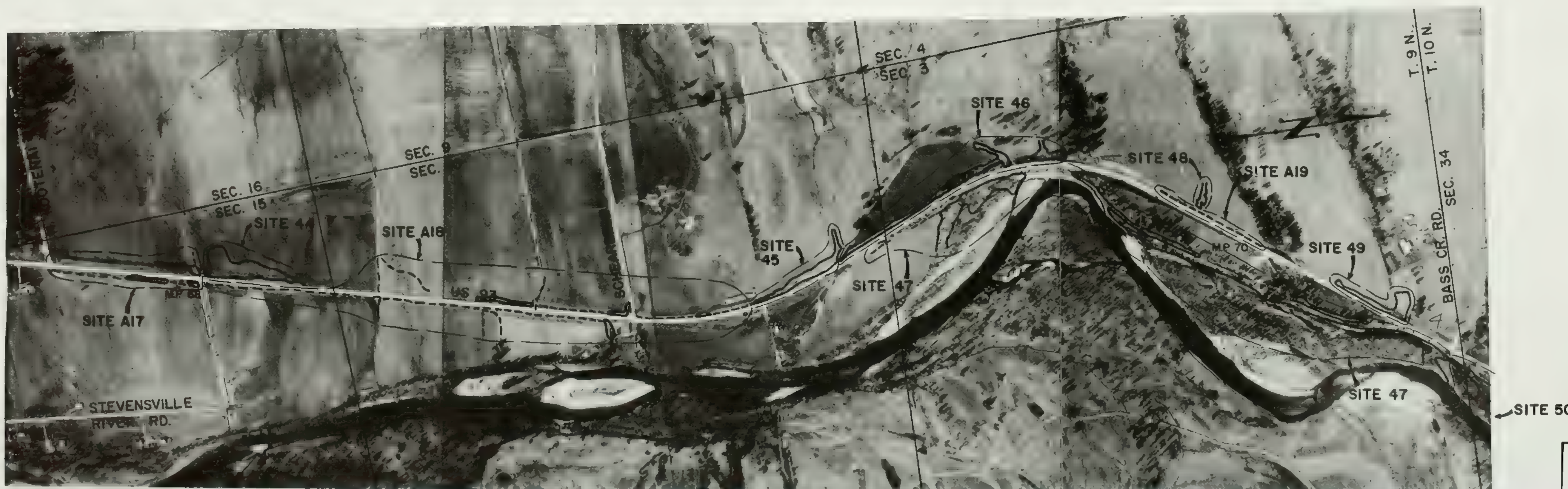
SITE 50

Study Corridor = 520-foot wide along existing centerline

OEA Research, Inc PRH/ch April 1994

SHEET 1 OF 3

NH 7-1(53)59
VICTOR - FLORENCE
RAVALLI COUNTY
15.20 MILES
SCALE 0 500 1000 1500
PHOTO DATE 3-9-92



LEGEND - WETLANDS DELINEATION

Discreet Wetland

Wetland Site

SITE 50

Study Corridor = 520-foot wide along existing centerline

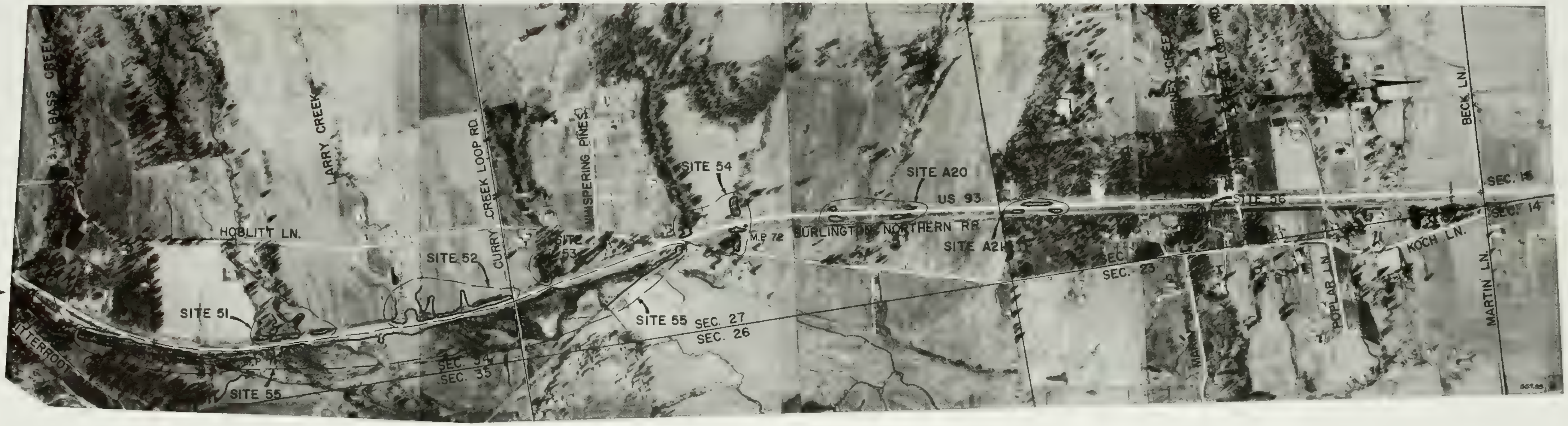
OEA Research, Inc. PRH/ch April 1994

SHEET 2 OF 3

NH 7-1(53)59
VICTOR - FLORENCE
RAVALLI COUNTY
15.20 MILES
SCALE 0 500 1000 1500
PHOTO DATE 3-9-92

T. 10 N.
R. 20 W.

SITE 50



T. 10 N.
R. 20 W.

LEGEND - WETLANDS DELINEATION

Discreet Wetland

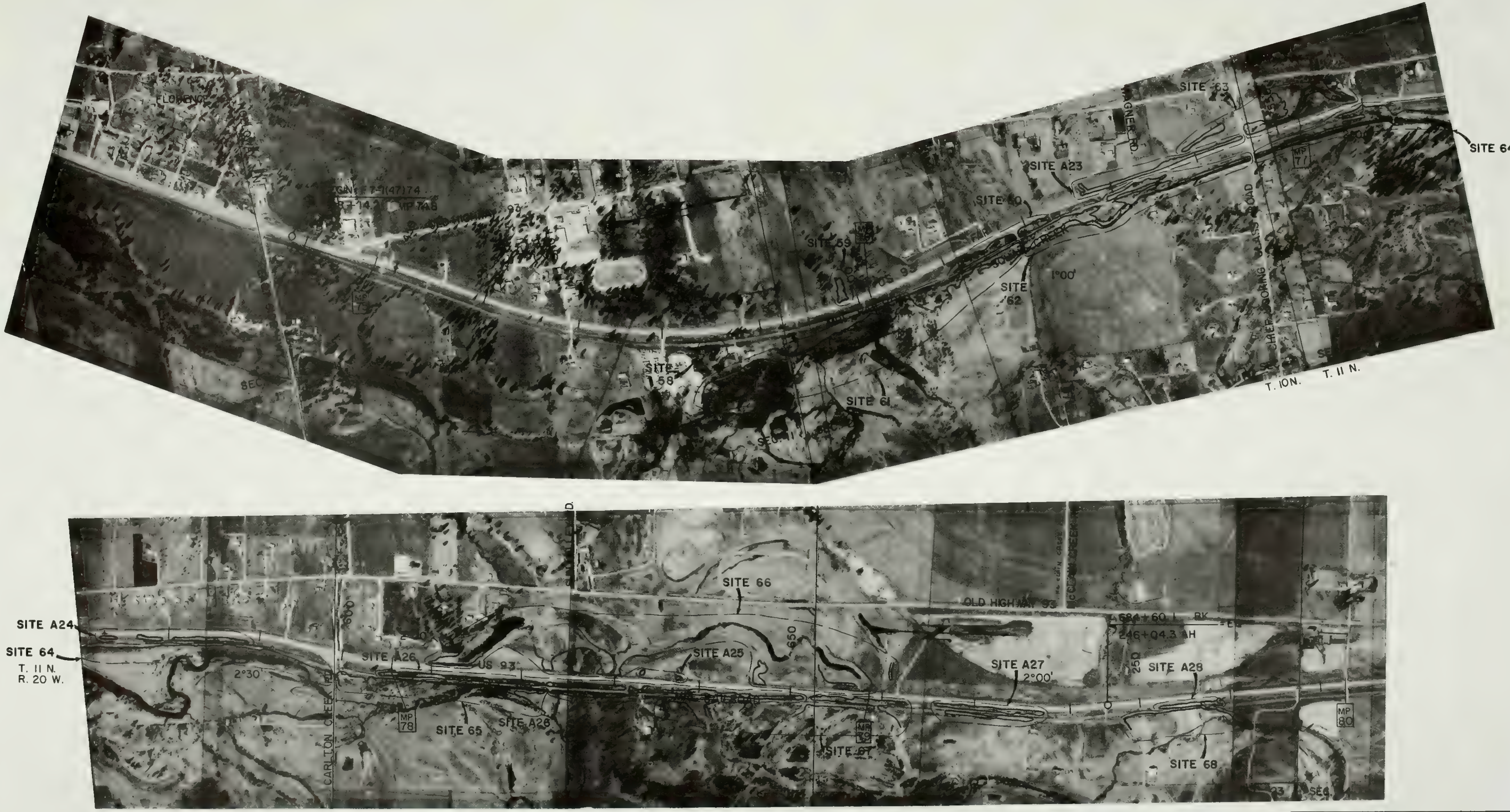
Wetland Site

SITE 50

Study Corridor = 520-foot wide along existing centerline

OEA Research, Inc PRH/ch April 1994

NH 7-1(53)59 SHEET 3 OF 3
VICTOR - FLORENCE
RAVALLI COUNTY
15.20 MILES
SCALE 0 500 1000 1500
PHOTO DATE 3-9-92



LEGEND - WETLANDS DELINEATION

Discreet Wetland

Wetland Site

SITE 50

Study Corridor = 520-foot wide along existing centerline

OEA Research, Inc PRH/ch April 1994

F 7-1(47)74 1/2

FLORENCE-LOLO

RAVALLI & MISSOULA

COUNTIES 9.7 MILES

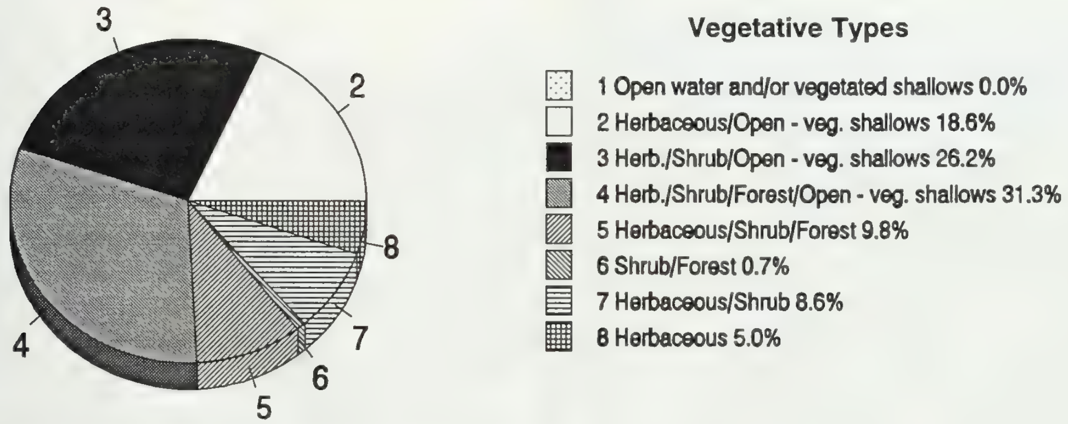
SCALE 0 500 1000 1500

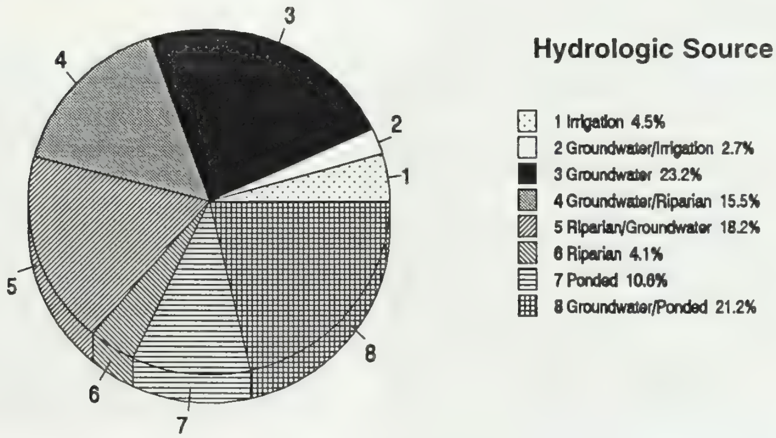
PHOTO DATE 4-1-91

Topographic features such as glaciated depressions and ancient meanders of the Bitterroot River and its tributaries, together with the confining effects of the existing highway and railway berms tend to create ponding of surface water; thus influencing the area's hydrology and the occurrence of wetlands. An additional contributor is the prevalence of shallow groundwaters exiting glacial terraces and flowing into these low lying areas on their down-gradient flow from the Bitterroot Mountains on the west to the Bitterroot River east of the highway.

The wetland evaluation delineated 260 discreet wetlands that were consolidated into 97 sites after field and office analysis to combine them into ecologically and/or hydrologically related sites. Wetlands which likely meet jurisdictional wetland or other regulatory definitions comprise a total of 107 hectares (260.5 acres). Figure 3-7 depicts the dominant vegetative type and dominant hydrologic source. Figure 3-8 is a color plate containing photographs of typical wetland areas within the corridor.

FIGURE 3-7
WETLAND VEGETATIVE TYPES AND HYDROLOGIC SOURCES





Wetland Functions and Values: Functions of a wetland are the physical, chemical, or biological processes or attributes of a wetland without regard to their importance to society. Values are defined as the wetland processes or attributes that are valuable or beneficial to society. Functions and values evaluated in the wetland study include the following. Those marked with an asterisk (*) are the primary functions and values present within the study area.

- groundwater recharge/discharge
- flood flow alteration *
- sediment stabilization
- sediment/toxicant retention

U.S. Highway 93
HAMILTON TO LOLO
ENVIRONMENTAL IMPACT STATEMENT

FIGURE 3-8
TYPICAL WETLAND AREAS

- nutrient removal/transformation *
- production export
- wildlife diversity/abundance *
- aquatic diversity/abundance *
- food chain support *
- recreation
- uniqueness/heritage

Each individual wetland area was evaluated with regard to these functions and values in accordance with the Interagency procedure. Site-specific inventory of the functions and values identified is shown on the individual field forms found in Appendix B of the Wetlands Evaluation Report. A qualitative rating of "low", "moderate", or "high" was assigned to each site for discussion purposes based on the scoring of functions and values for each individual wetland area tabulated on rating sheets in the Wetlands Evaluation Report. This qualitative rating identifies the potential degree that impacts to wetlands may have in disrupting the functions and values. These values are shown in the summary table hereafter (3-7) to help identify the more important wetland areas and complexes.

Wetland functions and values are based on the combination of judgements about a number of factors that make wetlands areas of special concern. These include, among others:

- flood storage potential
- foodchain support potential
- amount of various types of habitats
- wildlife and fisheries utilization
- recreational use potential

Figure 3-9 depicts the overall distribution of wetlands in the study corridor according to function and value rating. About ¾ of the wetlands have moderate to moderately high functions and values; the remaining are considered low to moderate. No areas of high function and value were found.

FIGURE 3-9
FUNCTION AND VALUE RATING

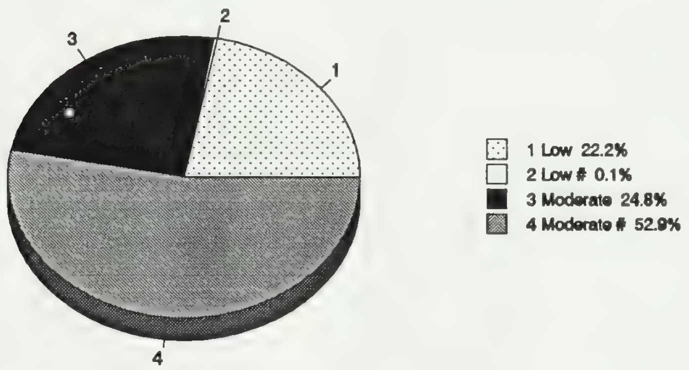


Table 3-7 presents the various wetland sites, their location, their hydrologic source and dominant vegetation type, their function and value rating, and their size with respect to the 158 m (520 ft) wide area actually studied. The site numbers correspond to the information depicted in Figure 3-6.

TABLE 3-7
SUMMARY OF WETLAND OCCURRENCE

Site #	WETLAND TYPES		Function & Value Rating ***	158 m (520 ft) STUDY CORRIDOR		MILEPOST	
	Hydrologic Category & Veg. Dominance Type *	Hydrologic Source **		acres	hectares		
1	2AB	I	low	0.12	0.05	49.00	---
2	2ABC, 3ABD	R/G	mod	2.34	0.95	49.25	49.50
30	2A	G(I)	low	0.87	0.35	49.70	---
A1	2A	P	low	0.06	0.02	49.80	---
4	2A, 3AB	G	low	0.34	0.14	49.90	---
A2	2A	P	low	0.02	0.04	49.90	49.95
5	2AB	G(I)	low	3.56	1.44	49.90	50.10
6	3ABC, 2ABC	R/I/G	mod	3.76	1.52	50.05	50.25
A3	2A	P	low	0.03	0.01	50.15	---
7	3ABC(D), O	R	mod #	0.00	0.00	50.30	50.50
A4	2A	P	low	0.01	0.00	50.35	---
A5	2A	P	low	0.07	0.03	50.60	50.65
8	3ABC, 1 DO	R	mod	3.55	1.44	50.60	50.80
A6	2AB	P	low	0.09	0.04	50.85	50.95
9	O, 1D, 2ABC	G/P(I)	mod #	5.00	2.02	51.15	51.45
10	2AB, 1D	I/G	low	5.35	2.17	51.45	51.85
11	2ABC, 3ABC,1DO	R/G	mod	7.60	3.08	54.40	54.65
12	1 D	I/P	low	0.13	0.05	54.80	---
A7	2A/B	I/P	low	0.34	0.14	54.95	---
15	2AB, 1D, O	G	mod #	5.43	2.20	54.95	55.30
13	2AB, 1D	I	low	0.23	0.09	55.15	---
14	2AB(C), 1DO	G/P(I)	low	2.27	0.92	55.20	55.40
16	3ABC, 2BC, O	R/G	mod	2.09	0.85	55.45	55.50
17	1D, 2AB	I(P)	low	1.11	0.45	55.70	55.75
19	2AB, 1D	G	mod #	0.00	0.00	55.75	56.30
18	2AB, 1D	I	low	0.52	0.21	56.20	---
20	2A	P/I	low	0.52	0.21	56.40	56.50
21	2ABC	G	low	3.82	1.54	56.65	56.75
22	1D, 2A	I(P)	low	0.12	0.05	56.90	---
23	3ABC, 2AB(C)	R	mod	1.22	0.49	57.00	57.05
24	2A	P/I	low	0.35	0.14	57.40	57.45
25	2AB, 1D	P/I	low	4.11	1.66	58.85	59.00
26	2A(B), 1D	G/P	low	1.98	0.80	59.50	---
27	3AB, 2AB	R/G	mod	2.46	1.00	59.65	59.80
28	O, 1D, 2AB	G	low	4.23	1.71	60.05	60.30
29	2AB, 3AB	I	low	1.88	0.76	60.60	60.70
A8	2A	P	low	0.32	0.13	61.35	61.50
30	2AB, 3ABC, 2A	R	mod	3.56	1.44	61.50	61.70
31	2AB	G/I	low	1.88	0.76	61.85	61.90
32	2AB	G/I	low	2.77	1.12	62.20	62.30
A9	2A	P	low	0.11	0.05	62.75	---
33	2A, 2BC, O	G	low	2.17	0.88	62.85	62.95
34	2AB(C), 1D	G	mod	8.10	3.28	63.20	63.55
35	O, 1D, 2ABC	G	mod #	4.13	1.67	63.65	63.90

TABLE 3-7
SUMMARY OF WETLAND OCCURRENCE

Site #	WETLAND TYPES		Function & Value Rating ***	158 m (520 ft) STUDY CORRIDOR		MILEPOST	
	Hydrologic Category & Veg. Dominance Type *	Hydrologic Source **		acres	hectares		
A10	2A	P	low	0.23	0.09	63.80	63.90
A11	2AB, 1D	P	low	0.15	0.06	64.20	---
36	O, 2AB, 1D	G	mod	2.55	1.03	64.20	64.30
A12	2A	P	low	0.14	0.06	64.55	---
37	1DO, 2ABC, 3ABC	R/G	mod #	0.53	0.22	64.60	64.70
A13	combine w/site 38					64.75	65.05
38	2AB, 3AB, 1OBD	G/R/P	mod #	4.20	1.70	64.70	65.05
39	2ABC	I/G	mod	0.43	0.17	65.15	---
A14	2A	P	low	0.07	0.03	65.30	65.40
40	3BC (est.)	R/G	unknown	0.99	0.40	65.40	65.50
41	2AB(C)	G	mod #	1.96	0.79	65.55	65.70
A15	2AB	P	low	0.16	0.06	65.70	65.95
42	3AB	G/I	low #	0.34	0.14	65.80	---
43	O, 1BCD, 2AB, 3AB	R/P		9.52	3.85	65.95	66.30
A16	2AB	P	low	0.38	0.15	67.50	67.60
A17	2AB	P	low	1.74	0.71	67.75	68.00
44	2A	G	low	1.96	0.79	68.05	68.20
A18	2A	P/I	low	2.99	1.21	68.35	69.00
45	2A(B)	P	low	1.28	0.52	69.00	69.20
46	2AB, O, 1D	P/G	mod #	1.63	0.66	69.15	69.55
47	2ABC, 2A, 3BC(D)	G/R	mod #	7.02	2.84	69.40	70.45
A19	2A	I/G	low	0.20	0.08	69.80	70.50
48	2A	I	low	0.43	0.18	69.95	---
49	2AB, 3AB	P/R(I)	low	1.00	0.41	70.30	---
50	3BC, 2AB	R	mod #	0.33	0.13	70.50	70.65
51	2ABC	I	low	0.66	0.27	71.10	71.20
52	2AB, 3A	R(I)	low	1.36	0.55	71.40	71.55
53	2A, 3B	R	low	0.32	0.13	71.60	---
54	2AB(C), 1AD	G	mod	0.81	0.33	71.85	72.00
55	3ABC, 2ABC, 1DO	R/G	mod #	15.54	6.29	70.65	71.90
A20	2A	P(I)	low	0.46	0.19	72.25	72.40
A21	2A(B)	P	low	0.24	0.10	72.60	72.70
56	3BC	R	mod	0.38	0.15	72.95	---
A22	2AB	P(R,I)	low	0.94	0.38	73.70	74.00
57	2A, 1D, 2BC	G/R	mod	5.94	2.40	74.00	74.20
59	2AB	I	low	0.50	0.20	75.90	---
60	1DAO, 2ABC	P(I)	mod #	1.93	0.78	76.20	76.40
62	3AB, 2AB, 1D0	G/R	mod	3.70	1.50	76.30	76.85
A23	2A, 3A, 1D	P	low	0.76	0.31	76.45	76.85
63	1DO, 2AB	G	mod	2.77	1.12	76.75	77.15
64	1ADO, 2AB	G	mod #	16.22	6.56	76.90	77.85
A24	2A	P	low	1.02	0.41	77.35	77.70
A26	combine w/site 66					77.95	78.50
66	2ABC, 1DO	G	mod #	4.35	1.76	78.05	79.00

TABLE 3-7
SUMMARY OF WETLAND OCCURRENCE

Site #	WETLAND TYPES		Function & Value Rating ***	158 m (520 ft) STUDY CORRIDOR		MILEPOST	
	Hydrologic Category & Veg. Dominance Type *	Hydrologic Source **		acres	hectares		
A25	2A	P	low	0.10	0.04	78.50	78.85
A29	2ABC	G/P	low	0.15	0.06	80.35	---
69	1ADO, 2A	G/P	mod #	31.69	12.82	80.85	81.45
70	combine w/site 69					81.50	81.85
A30	combine w/site 69					80.80	81.55
A31	combine w/site 69					81.55	81.90
71	2A, 1ADO	G/P	mod	10.09	4.09	81.85	82.00
A32	combine w/site 71					81.50	82.00
72	3BC, 2A	R/G	mod	3.38	1.37	82.80	82.90
	TOTALS			260.50	107.09		

* Wetland Types follow the Montana Interagency Wetlands Group (1988) as modified from Novitsky 1979.

1 Hydrologic Category = sites with permanent shallow (<6.6 ft) water [>9 mos/yr]
Vegetative Dominance Type
- A - Floating
- B - Rooted Submerged
- C - Rooted Floating-Leaved
- D - Rooted Emergent

2 Hydrologic Category = sites with seasonal or permanent water tables, but without permanent standing water
- A - Herbaceous
- B - Shrub
- C - Forested
- D - Unvegetated

3 Hydrologic Category = riparian sites adjacent to streams or rivers with seasonally saturated soil conditions
- A - Herbaceous
- B - Shrub
- C - Forested
- D - Unvegetated

** Hydrologic Source:
I=irrigation supported; R=riparian; P=ponded generally due to highway or railroad berms; g=groundwater supported

*** Function & Value Rating: See Wetlands Evaluation Report. "#" = slight increase due to professional judgement

Wildlife Associated with Wetlands: Wildlife associated with the wetlands/riparian areas in the Valley is abundant. White-tailed deer, elk, and moose are found throughout the Bitterroot Valley and frequently cross the highway (see separate discussion under Wildlife). Animals are known to cross the highway and river in the Bass Creek Hill area to settle in the Lee Metcalf Wildlife Refuge, which exemplifies the fact that wildlife use the riparian areas along streams to move from the mountains to the Bitterroot River and associated wetland areas.

Waterfowl and migrant song birds are also abundant, using the wetlands for nesting and foraging. Eagles, osprey, hawks, falcons, and other raptors use wetlands for hunting grounds. Some of the larger cottonwood and pine areas, primarily located near the Bitterroot River, provide nesting habitat for the raptors. Numerous species of small mammals and furbearers occur. Several of the tributary streams to the Bitterroot River crossed by Highway 93 are important spawning areas for rainbow and/or brown trout.

Other Related Areas: The Lee Metcalf National Wildlife Refuge is located on the east side of the Bitterroot River just north of Stevensville. Its boundary is close to the study corridor in the Bass Creek Hill area. The Refuge is an important area resource for wetlands, wildlife, and associated recreational uses such as the viewing and study of these resources. Over 200 species of birds and a variety of wildlife species have been observed on the 1129 hectare (2800 acre) area of the refuge.

A similar facility, the Otto Teller Wildlife Refuge (privately administrated) is located east of the Bitterroot River and south of Stevensville near the Bell Crossing. It also provides resources similar to the Lee Metcalf Refuge.

The highway crosses a number of tributary streams to the Bitterroot River. As mentioned, many of these sustain riparian areas along their length together with riffle-pool complexes that contribute to both fishery and wildlife habitat.

3.10 WILDLIFE

The Biological Resources Report[6], cited earlier, contains extensive information on wildlife resources in the project area. In general, the undeveloped nature of much of the corridor, including wetlands and riparian areas, provides habitat supporting wildlife. A classic example is the Lee Metcalf National Wildlife Refuge located immediately east of the corridor near the Bass Creek Hill area. Important summary information from the report is presented in the sections that follow.

Habitat: The diversity of land uses and abundance of wetland and riparian areas provide significant wildlife habitat in the project corridor. Habitat areas include:

- Disturbed and Roadside Areas - These are areas associated with existing development and disturbed areas immediately adjacent to the highway. Although they do not directly provide habitat, they do provide foraging opportunities for wildlife; especially for raptors feeding on carrion.

- Wetlands - A variety of wetland types are presently providing a range and diversity of structural components and habitat opportunities. Quality songbird, waterfowl, fisheries, and aquatic wildlife habitats are found in these wetland types. Some of the wetlands also function as important layover areas for migrating waterfowl.

- Riparian - This habitat type provides a diversity of wildlife habitats such as songbird nesting and foraging areas, raptor nesting sites, and big game cover and travel corridors. These riparian areas generally provide high valued wildlife habitat.

- Riverine - This type of habitat is associated with streams, creeks, rivers, and is predominantly associated with aquatic resources and fisheries described later in this document.

- Coniferous - This habitat provides travel corridors for wildlife and nesting and foraging habitat for a variety of big game and non-game species.

- Cultivated/Pastures - Importance to wildlife or habitat of these areas is minimal. However, they do provide some foraging opportunities for raptors, deer, and elk.

- Residential/Developed - This type of land use consists predominantly of human development and is generally considered to possess minimal value for wildlife habitat.

Species: The predominant wildlife resources present in the project area are those species associated with wetland/riparian communities such as waterfowl, shore birds, songbirds, herptiles, and an increasing white-tailed deer population. These and other prevalent wildlife in the area include:

- Big Game - Deer, elk, and moose are found throughout the project area. White-tailed deer are more commonly found in the valley bottoms, while mule deer are found in the higher foothills and mountains.

  White-tailed deer are the most abundant big game species in the project vicinity with population numbers estimated to be over 6,000 in the valley and increasing annually. White-tails are found year-round throughout the project area. They are found in most types of habitats frequenting the riparian,

pasture, and coniferous types. Migrational movements of deer have not been noted in the project area because it is within the home ranges of the resident deer. Movement of deer in the project area is more on a daily rather than a seasonal basis. Deer movement across the highway is a significant problem that will be discussed in the next subsection.

Elk are found throughout the Bitterroot Valley, frequenting the uplands or foothill areas. Elk occasionally move downslope using the riparian bottoms traversing the project area. During the fall, approximately 20 elk are known to migrate from the foothills of the Bitterroots crossing Highway 93 at the Bass Creek Hill and settling into the Lee Metcalf Wildlife Refuge.

Moose are found throughout the valley often inhabiting riparian and wetland habitats. Population numbers are estimated at 1,000 for the valley. Some vehicle collisions with moose occur, but at a much lower rate than the deer vehicle collisions.

- Birds - The wetlands and riparian communities found in the project corridor provide habitat for numerous and diverse species of birds. Waterfowl and neotropical migrant songbirds are abundant, nesting and foraging in these wetland and riparian areas. Numerous migratory birds travel through the Bitterroot Valley in the spring and fall using the wetlands of all types and quality as temporary stops on their journeys. Agricultural fields, often temporarily flooded during the spring runoff, provide important feeding and layover areas for migrating waterfowl. The Lee Metcalf National Wildlife Refuge, rich in waterfowl and shore birds, provides a haven for migratory and resident birds. A species list of birds found in the Bitterroot area is contained in the Biological Resources Report.[6]

  Osprey, hawks, falcons, and other raptors use the wetland, riparian, and agricultural lands for hunting grounds. Some of the larger cottonwoods and pines, primarily located near the Bitterroot River, provide nesting habitat for the raptors. The river also contains some heron rookeries. Bald eagles are present in the area; however more specific discussion on them and peregrine falcons is given in the "Threatened and Endangered Species" section of this chapter.

- Small Mammals - Numerous species of small mammals including muskrats, otters, mink, and voles are present in the wetland, riparian, and riverine habitats. Coyote and fox sign and burrows were noted, especially in uplands adjacent to wetland or riparian areas.

- Herptiles - Seven amphibians may occur in the project area due to the presence of suitable habitat. These species are:

  long-toed salamander
  western toad
  spotted frog
  leopard frog
  bull frog
  Pacific chorus frog
  tailed frog

  Additionally, ten reptiles are expected to be present in the project area due to the presence of suitable habitat. These species include:

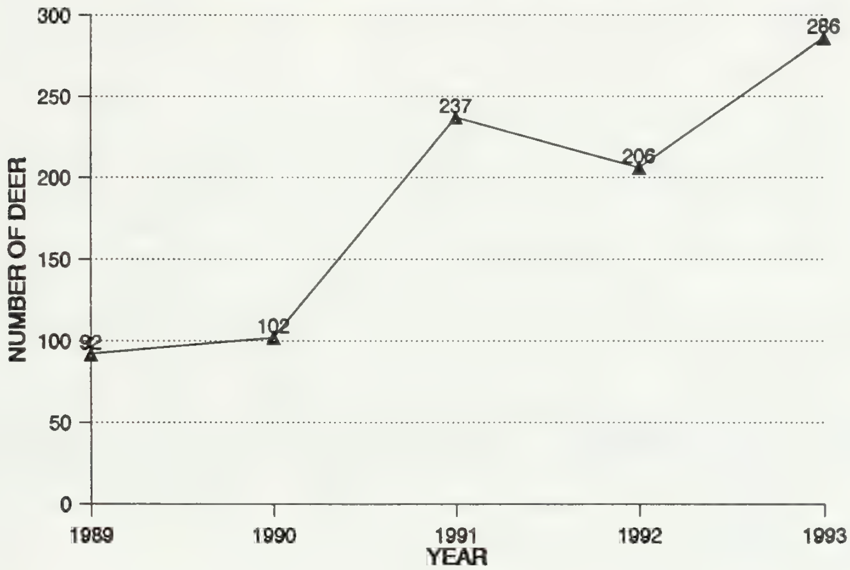
  painted turtle
  softshell turtle (non-native)
  snapping turtle (non-native)
  western skink
  northern alligator lizard
  yellow-bellied racer
  bull snake
  common garter snake

western garter snake
rubber boa

Deer Kill Study: A common and growing problem in the Bitterroot Valley is the occurrence of deer/vehicle collisions resulting when deer attempt to crossing Highway 93. This major issue was the most frequently mentioned in the public scoping meetings and a special Deer Kill Study[8] was commissioned to determine the nature and extent of the problem along with exploring potential alternatives to reduce it.

It is estimated that as many as 1,000 deer are killed each year in the entire Bitterroot Valley resulting in over $700,000 of property damage. Figure 3-10 presents the increase in killed deer removed from the highway in the period from 1989-93 and Figure 3-11 presents the monthly breakdown of a five year history of deer/vehicle collisions in the project corridor. Conclusions that can be drawn are that the deer population is on the increase and that the highest incidence of deer collision is during the fall rut (August through November). As expected, most of the collisions occur during the dawn and dusk periods of the day. These figures represent a 300% increase in deer-vehicle collisions in the period from 1989 to 1993.

FIGURE 3-10
STUDY AREA DEER KILL HISTORY



Deer cross the highway throughout the project area rather than just a few main crossings (game trails). This may be due to the high number of deer present in the Valley and the fact that they use the habitat as part of their home range rather than as part of a migratory route. However, wildlife frequently use the riparian habitats and their associated dense shrub component as cover for their movement. Examples are the Bass Creek Hill area and the McCalla Creek Bridge where positive evidence of game movement was observed.

3.11 FISH

Part of the Biological Resources Report[6] contained information on aquatic resources including information on fisheries. The following subsections summarize important information from the study.

Fisheries: Section 3.2 presented information on surface waters in the project area and the resources they represent. The Bitterroot River flowing northerly through the project corridor is an important sport fishery for trout anglers in western Montana. Healthy tributary streams to it are integral to the maintenance of the main stem river fish population. Table 3-8 presents the streams in the project area for which fisheries data is available and which are worthy of consideration for their resources as listed in the table.

FIGURE 3-11
MONTHLY DEER KILL TRENDS

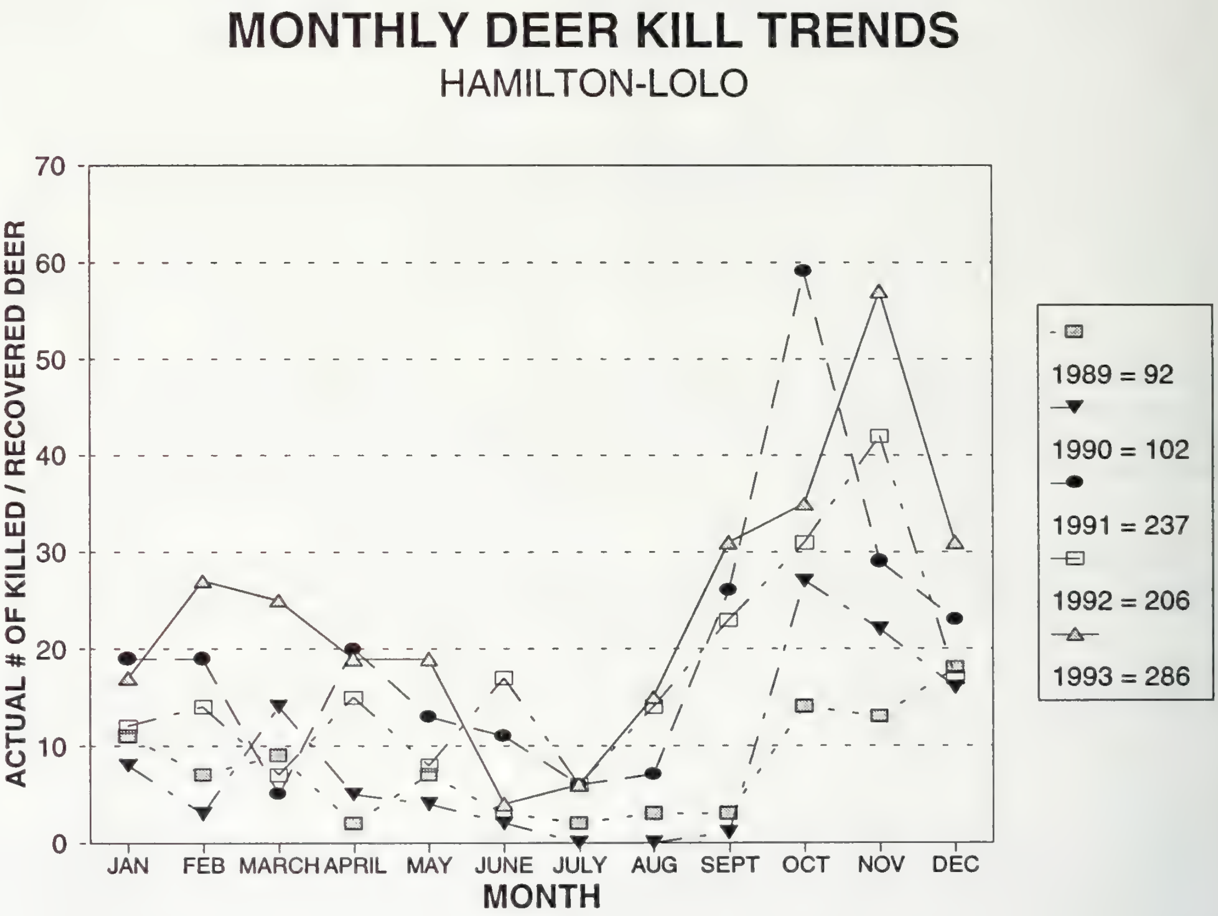


TABLE 3-8
FISHERIES DATA

Milepost	Stream	SPECIES										
		Rainbow Trout	Brown Trout	Westslope Cutthroat	Cutthroat Trout	Brook Trout	Bull Trout	Mountain Whitefish	Sucker	Shiner	Longnose Dace	Other *
49.0 - 83.2	Bitterroot River	X	X	X	X	X		X	X	X	X	X
50.2	Blodgett Creek	X										
54.6	Mill Creek	X	X									
56.7	Bear Creek South	X		X			X		X			
57.0	Bear Creek North	X	X				X					
59.8	Sweathouse Creek	X	X									
61.5	Big Creek	X	X	X				X				
66.1	Kootenai Creek	X	X									
70.5	Bass Creek			X		X						
71.2	Larry Creek			X								
72.9	Sweeney Creek	X			X	X						
82.9	Lolo Creek	X	X		X	X		X	X	X	X	

*Other: Northern Pike, Some Bass

Species: The Bitterroot River and its tributaries contain a variety of species of fish. Most run up the river and into the tributaries for spawning. There have even been fish originally tagged in the Clark Fork that have been discovered during fish studies on tributaries to the Bitterroot River. Species in the area include, but are not necessary limited to:

- Trout
  - rainbow
  - brown
  - westslope cutthroat
  - cutthroat
  - brook
  - bull

- Other
  - mountain whitefish
  - large scale sucker
  - longnose sucker
  - redside shiner
  - longnose dace
  - northern pike
  - bass

The location of the various species in these streams within the corridor is generally shown in Table 3-8.

Rare and Sensitive Fish: Westslope cutthroat trout are found in the Bitterroot River drainage and are designated as a species of special concern by the Montana Department of Fish, Wildlife and Parks, and the Montana Chapter of the American Fisheries Society. They are also designated as a sensitive species by the Forest Service.

Originally cutthroat trout were abundant in all of the streams in or adjacent to the mountains of Montana. At present, the distribution is quite restricted. Cutthroat trout spawn in the spring at the same time and in the same places as rainbow trout and the two species readily hybridize. In the Bitterroot River drainage, westslope cutthroat are found primarily in headwater streams. Westslope cutthroat in the Bitterroot River are most likely rare or extinct.

Bull trout are a species warranted for federal listing; thus impacts to them were also considered and studied in anticipation of their becoming listed. In Montana the bull trout is native to the Columbia and Saskatchewan River drainages. Bull trout can either be resident, fluvial or adfluvial depending on their migration. Resident fish spend their entire lives in the same or nearby stream in which they were hatched. Fluvial fish are hatched and stay in tributary streams for one to four years before migrating to a river area. Adfluvial do likewise and then migrate to a lake where they grow to maturity.

Historically, bull trout were likely distributed throughout the Bitterroot River drainage. Presently bull trout appear to be extinct or nearly so in the main stem of the Bitterroot River from the mouth at Clark Fork to Blodgett Creek. From Blodgett Creek to the East Fork of the Bitterroot, bull trout are rare.

Mill Creek, South Bear Creek, Sweathouse Creek, Big Creek, Sweeney Creek, and Lolo Creek are all streams crossed by Highway 93 in the project corridor that are known to contain bull trout. In all cases, the bull trout are confined to the upstream areas of these tributaries in national forest areas well away from the study corridor. Bull trout are rare or have been eliminated in the stream reaches where the highway crosses.

Fish Passage: The degree of access afforded to the fish in reaching tributary streams is an important factor in the value of the stream as a fishery. Fish passage is not a problem in the streams listed as having value as fisheries in Table 3-8. Other tributary streams in the project area are known to dry up seasonally or experience a greatly reduced flow. Elsewhere, barriers to fish passage are created by restrictive culverts or drainage structures under the highway and railroad fills. In some cases, the downstream end of culverts are above stream or river water levels through much of the season. Elsewhere they may be restricted by debris, accumulation of bed material, or perhaps the restrictive geometry of the culvert itself.

It is not generally known if certain tributaries would become valuable fisheries if barriers to fish passage were removed. However, as a general practice, maintenance or restoration of fish passage should be an important consideration for any "build" alternatives that may be implemented.

3.12 THREATENED AND ENDANGERED SPECIES

Section 7 of the *Endangered Species Act of 1973*, as amended, requires that activities authorized, funded, or conducted by federal agencies (such as the Federal Highways Administration) must be reviewed for their potential effects upon federally listed, threatened and endangered species. Written correspondence with the US Fish and Wildlife Service[9] indicated that one endangered species (peregrine falcon) and one threatened species (bald eagle) have the potential to occur in the project corridor and should be considered for possible impacts. The species list was updated and confirmed valid in March 1996 and will need to be consulted again just prior to beginning any construction activities in order to reconfirm the status of potential impacts.

No threatened or endangered fish species were identified. Rare and sensitive fish species were discussed above. Two threatened plant species are listed for Montana (Water Howdlia and Ute Lady-Tresses), but neither occur in the project area.

A Biological Assessment[10] studying threatened and endangered species was prepared documenting background information and potential impacts on the species. A summary of pertinent information from that report is given in the sections that follow.

Bald Eagle: This federally listed threatened species is generally associated with areas of open water where they feed on waterfowl and fish. Less often the bald eagle is also found in upland habitats, scavenging on carcasses or feeding on small mammals. Road killed animals, such as deer, also provide a food source, especially during winter months. Nesting habitat generally consists of large live trees used for nest building and perching that are located within two visual miles of open water.

The Bitterroot Valley falls within the upper Columbia Basin Eagle Management Zone as delineated in the *Montana Bald Eagle Management Plan of 1986*. The Montana bald eagle nesting population is currently on the increase with new territories being established throughout much of Montana.

Bald eagles use the Bitterroot Valley year-round. Wintering and migrating eagles are often observed along the Bitterroot River perching in cottonwoods or foraging for fish and waterfowl. The winter population for the Valley is estimated to be 50 bald eagles. Unlike some other areas in Montana, eagles in the Bitterroot Valley are not commonly observed feeding on road killed animals along Highway 93. This may be due to rapid removal of the carcasses by maintenance crews or perhaps that nearby wetlands provide abundant foraging opportunities preferred to road killed deer.

Nesting, roosting and perching habitats occur in riparian cottonwood forests along the Bitterroot River and in nearby stringers of mature ponderosa pine stems. Two active nesting territories occur in the vicinity of the project; one north of Florence along the Bitterroot River and the other located on the Lee Metcalf National Wildlife Refuge. These nest territories are approximately 1.6 to 3.2 km (1 to 2 mi) east of the existing Highway 93.

Peregrine Falcon: These endangered birds are found in a variety of conditions inhabiting both urban and rural settings. Nesting habitat for peregrines includes cliffs, rock outcrops or cliff-like structures. Nest sites frequently overlook open spaces such as meadows or bodies of water. Peregrines primarily feed on passerine birds; therefore the availability of waterfowl and waterfowl habitat is often a critical element of the peregrine's home range.

Wetlands often are important foraging areas. Peregrine falcons will forage 16 to 32 km (10 to 20 mi) from their nesting site.

The Bitterroot Valley has been the site of a reintroduction program for this federally listed endangered species. Successful establishment of nesting peregrines has occurred. The Bitterroot Mountains provide quality nesting opportunities while the Bitterroot Valley offers an abundance of foraging areas. Although the project corridor lies well within the foraging range of nesting falcons, most of the known peregrine eyeries (nesting sites on cliffs or mountains) are well south or west of the project area. The closest known is at least 8.1 km (5 mi) from the corridor.

C. HUMAN ENVIRONMENT

3.13 SOCIAL

The Bitterroot Valley is rurally oriented and punctuated by a number of small communities affording the typical "small town America" lifestyle. The social appeal of the area is the opportunity to live the rural, small town lifestyle, and yet have the advantages of nearby major urban centers (Hamilton on the south and Missoula on the north) offering full commercial, cultural, and business opportunities close at hand. The information that follows will describe the social setting of the project corridor in terms of population and demographics, communities, community services, and related facets of the social background.

Information for this section was taken primarily from a Social/Economic Report[11] compiled for the project corridor, the 1990 US Census, and the Ravalli and Missoula County Comprehensive Plans.[12, 13] Whereas only about 19% of the total project is in Missoula County, and since this area is almost exclusively undeveloped (agricultural land) along the corridor with the exception of the community of Lolo, most of the discussion that follows centers around background information and statistics associated with Ravalli County. Noting the close similarities in lifestyle and demographic character of the two counties within the project corridor, it is safe to state that the information presented for Ravalli County will be very similar to that small portion of the project in Missoula County.

Current Population and Demographics: The Bitterroot Valley area is one of the fastest growing areas in the State and indications are that this trend will continue to the extent it is supported by the availability of services, affordable cost of land, and a healthy economy. Table 3-9 presents the characteristics of the current population in the County (1990) according to gender, racial/ethnic origin, and age. As the table indicates, the minority population in the County is very small (3.4%). Also, there are no specific areas with concentrations of minority populations. The principle components of population groups age-wise are children and middle-age adults.

TABLE 3-9
POPULATION AND DEMOGRAPHIC CHARACTERISTICS - RAVALLI COUNTY

SEX		Number	Percentage
Male		12,330	49.3
Female		12,680	50.7
	TOTAL	25,010	100.0
RACE			
Caucasian		24,159	96.6
African American		36	0.1
American Indian/Alute		287	1.1
Hispanic		369	1.5
Pacific Islander		72	0.3
Other		87	0.4
	TOTAL	25,010	100.0
AGE			
Children	0-11	4,502	18.0
Teenagers	12-19	3,001	12.0
Adults	20-29	2,252	9.0
	30-39	3,751	15.0
	40-49	3,501	14.0
	50-59	2,501	10.0
	60-69	2,501	10.0
	70+	3,001	12.0
	TOTAL	25,010	100.0

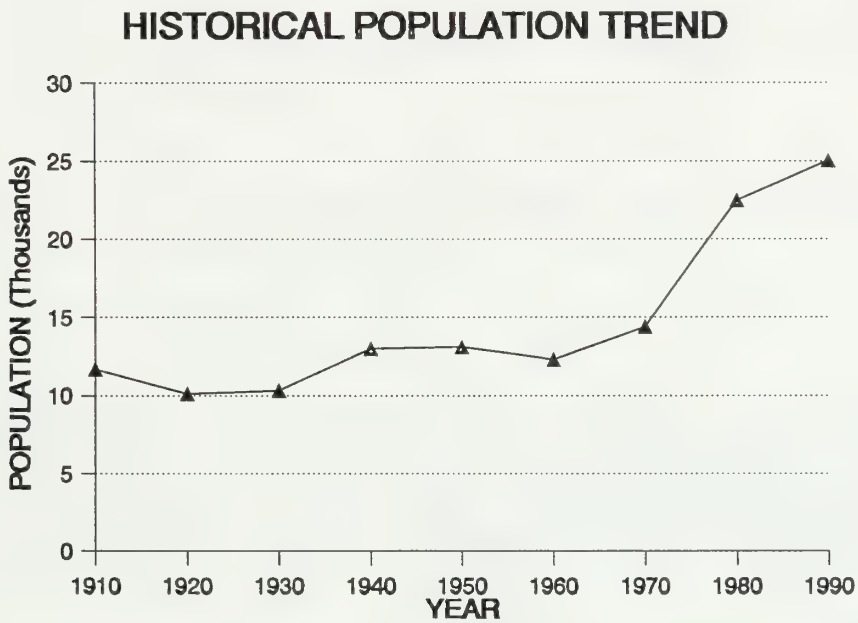
The future demographic structure of Ravalli County will largely depend on the migrants who will move in and out over the next several decades. Historically, almost 58% of Ravalli County residents were born outside of Montana, which places it first among the 12 most populous counties in the State having the highest proportion of residents born out-of-state. Talk is often heard about Ravalli County being a "retirement community" due to a perceived influx of families retiring elsewhere and moving to the area to enjoy the aesthetic beauties and "rural" lifestyle benefits.

Statistics show about 18% of the County population in 1990 had moved in from another State in the previous five years. Only about 5% of the in-migrants came from California, quite contrary to current popular accusations that "Californians are buying up the Bitterroot".

Although it ranked second among the 12 most populous Montana Counties in the percentage of population over the age of 65 and in households headed by elderly residents, only 16.6% of the population exceeds age 65 which is only slightly higher than the 13.3% average for the State as a whole. The average household size is 2.5 persons.

Figure 3-12 shows the historical population trend in the County from 1910 to 1990.

FIGURE 3-12



The figure reveals a positive growth rate since 1960 and a substantial annual growth rate (4.6%) between 1970 and 1980. For the decade, the population increased by 56%. Lately, the population has again been growing at a substantial rate; 1994 statistics indicated a 5.7% annual growth rate for the County.

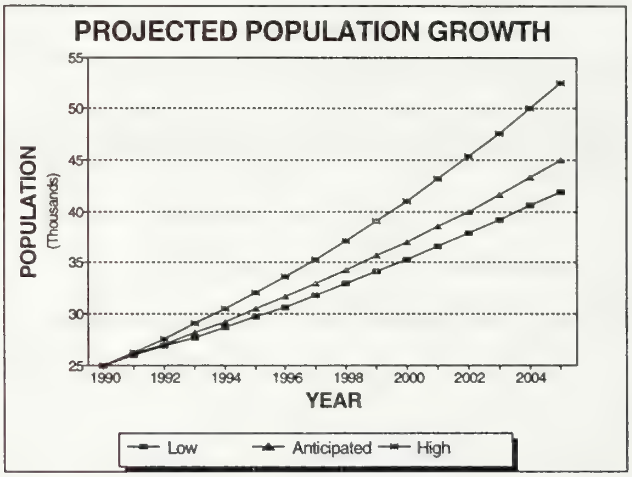
Another component to the population picture is seasonal population. There is a definite increase in population during the summer months from persons visiting family and friends in the Valley and the many tourists and recreationists visiting the Valley or passing through in route to nearby national parks and recreational areas. After examining occupancy records and other information available, the Comprehensive Plan indicates this number is nearly 10% of the base population figure and is likely to continue following that basic proportion into the future.

Future Population Growth: Statistical analysis of current and historical population data provides the opportunity to predict population growth into the near future. Projections beyond 20 years greatly diminish

in accuracy since so many varying factors play an important role in population growth and those factors often react very quickly to market changes such as economic opportunities, supply of goods and services, land values, etc. It is anticipated that recent population growth rates are likely to level off or reduce slightly since the supply of goods and services (e.g. builders and materials) necessary to sustain the high growth rate is limited and could easily be overcome by excessive demand and land values are beginning to increase significantly.

Figure 3-13 is a projection of the anticipated population growth in Ravalli County for the next 20 years. The similarity of the project corridor to the remainder of the County allows "adoption" of these projected growth rates to the study area. The figure indicates an expected 4% annual growth rate with a high probability that the population growth will actually fall somewhere between the lower bound 3.5% per year and the upper projected limit of 5% annually. These growth rates are consistent with those shown in the County Comprehensive Plan[12] and also statistical analyses of growth rates computed in the Traffic Study which looked at the growth of traffic in the recent past and projected it into the future (assumes traffic is proportional to population).

FIGURE 3-13



Currently, significant areas of vacant or agricultural land are available for development in the County in general and the study corridor in particular. While driving the corridor one quickly observes the undeveloped nature of much of the land use and is likely to conclude that the area is rural in nature and should continue to be so for some time. However, closer examination of Figure 4-5 in Chapter 4.0 quickly reveals the vast majority of this ground adjacent to US 93 through the corridor has already been platted for residential or commercial development.

Clearly the greatest and most often expressed social concern from public involvement is the issue of present and future growth in the Bitterroot Valley, especially the study corridor where a majority of the growth appears to be occurring. Strong polarization is present between business leaders, civic groups, chambers of commerce, and other citizens who welcome growth and actively seek economic development and other citizen groups, organizations, and individuals who fear a continuation of the high growth rate and/or uncontrolled growth will ruin the aesthetic appeal of the area, destroy the "rural" lifestyle, and adversely affect community character and cohesion.

A particular concern voiced by this latter group is the fear that if transportation improvements are implemented, then further growth of the area will occur and the quality of life will be adversely impacted ("if you build it, they will come").

Intuitively, this fear would seem to be justified. However, its application to the project area also requires a discussion of several other conditions playing an important part in the growth issue. Transportation improvements have been proposed and implemented in many parts of the country and the corresponding

impacts on growth and land use issues have been well studied and documented. Past experience indicates that construction of transportation facilities in areas that have none, or construction of improvements that attract traffic away from other possible routes are likely to have an appreciable influence on growth and land use.

On the other hand, improvements undertaken in areas where transportation facilities already exist and where there are no other routes or choices for alternate travel more commonly affect the rate of growth (accelerate or slow) depending on whether access is improved or denied. These studies go on to identify factors such as market forces, economics, access control, land use policies, aesthetic appeal, and other similar conditions have a far more profound effect on the amount and rate of growth than the condition of transportation facilities.

Closer examination of prevailing conditions in the Bitterroot substantiates these conclusions. First, transportation facilities already exist and US 93 is the only choice for arterial travel through the region. Traffic must use the facility to access Hamilton and Missoula which are the major centers offering employment, business, social, and cultural opportunities. The County comprehensive plans, economic studies by local groups, and technical reports prepared to support this environmental document all indicate growth in the Bitterroot will continue regardless of the condition of transportation facilities and that traffic from the growth will continue to use US 93 whether or not improvements are undertaken.

The explosive growth of the Bitterroot Valley in the past 20 years (56% from 1970 to 1980; currently close to 6% annually) occurred without any transportation improvements and continues to occur despite the seriously congested and inefficient condition of existing transportation facilities. Reasons for strong growth frequently suggested during public meetings include:

- aesthetic appeal of the area
- opportunity to live "rural" lifestyle while being reasonably close to and enjoying the economic, social and cultural benefits of a large metropolitan area (Missoula)
- fairly healthy and growing economy
- affordable land values
- moderate cost of living

As long as these conditions are prevalent and remain strong, continued strong growth will occur in the Bitterroot Valley and the project area, independent of improvements to transportation facilities. The keys for compatibility of transportation facilities with growth and growth areas are land use planning and access control. These issues are further discussed in Section 4.15.

Residential growth is anticipated to remain strong in Missoula's "bedroom" communities such as Lolo, Florence and Stevensville. To a lesser extent, Victor and Corvallis will also see residential growth to support Hamilton in response to a likely lower cost of living than the former areas if demands there begin to exceed the supply and their cost of living increases proportionately. This is consistent with the fact that many areas close to Missoula are already platted for subdivision development. As they develop and begin to fill, residential growth pressure will likely press onward into less developed areas of the project corridor.

Locations of commercial and industrial growth strongly depend on whether or not and how soon land use management plans are established and implemented. Current development patterns suggest it is likely that further extension of strip development will occur along US 93 unless land use planning and/or access controls are enacted. Most probable areas are around the intersection of major roads with Highway 93 such as Lolo, the Stevensville Y-intersection, Florence, Victor, Woodside, and North Hamilton.

Communities: The project corridor is predominantly rural and open in terms of development. However, several small communities have sprung up either to support agricultural operations as business centers or as stops affiliated with the railroad that runs through the area. Some recent growth has been in response to strip development along US Highway 93.

Figure 3-14 shows the communities in the project area. Most of the towns are unincorporated, relying upon the County government for most services. However, there are a number of civic groups such as chambers of commerce, economic development groups, water and sewer users associations, etc., that provide some local leadership and continuity to community cohesiveness.

While the communities are cohesive and united on an individual basis, there is not much overlap or notable cooperation between the individual communities. A survey taken for the Bitterroot Futures Study[14] provides insight into the prevailing social attitudes of the area residents. Table 3-10 highlights some of the issues and responses given. Note that several (e.g. uncontrolled growth in the Bitterroot, 85% yes) show very strong opinions.

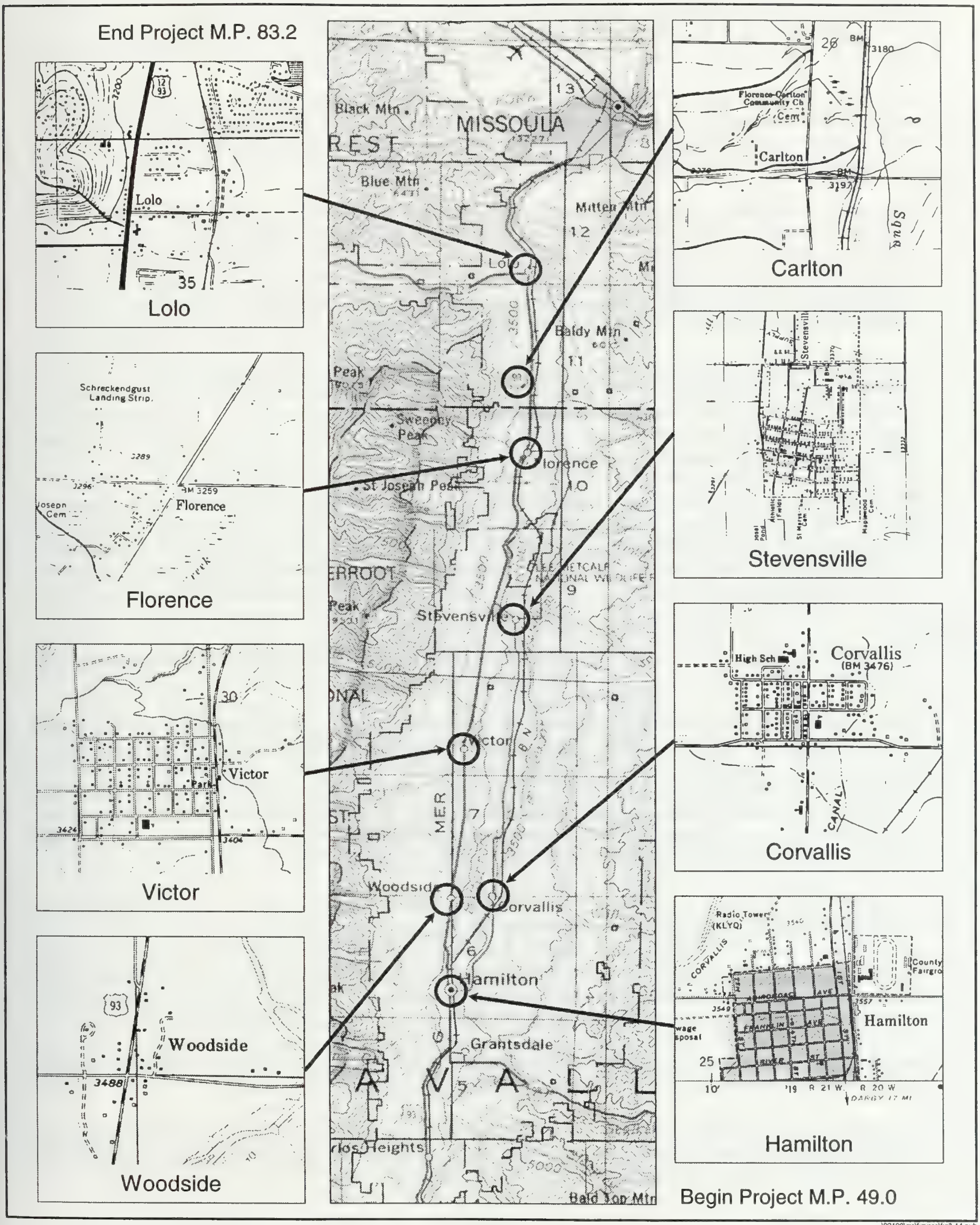
TABLE 3-10
SOCIAL ASSESSMENT SURVEY RESULTS

QUESTION	Percentage		
	YES	NO	DON'T KNOW
There is a polarization of community attitudes	76	6	18
The Bitterroot demonstrates civic pride in the general appearance of its communities	73	24	3
There is unity and cooperation among various communities	39	39	22
There is communication and cooperation between community organizations	40	33	27
There is strong leadership within the Bitterroot	48	50	2
There is uncontrolled growth in the Bitterroot	85	10	5
There is strong civic pride regarding history, art, etc., within the Bitterroot	81	10	9
There is an issue of inadequate public transportation	63	23	14
There is inadequate infrastructure within the Bitterroot	19	56	25
There is strong identifiable leadership in local government	21	64	15
There is polarization of attitudes regarding natural resource management in the Bitterroot	83	12	5
There is wide economic diversification in the Bitterroot	53	43	4
There is a lack of employment opportunities in the Bitterroot	88	6	6
Wages are low in the Bitterroot	81	8	11
There are adequate medical facilities in the Bitterroot	85	10	5
There are many avenues of social and recreational activities in the Bitterroot	76	14	10

The study went on to point out that one of the main social strengths of the area was the many active volunteers, organizations, and civic/service clubs, coupled with the willingness and ability of local residents in the Bitterroot to solve their own problems. Several indicated that the Bitterroot residents are proud of being "Bitterrooters" that have always been noted for being resilient and tenacious in meeting challenges.

Weaknesses perceived in the social character are the strong polarization of attitudes and the resulting dissention that has disunified community focus and individual relationships. Strong polarization issues are related to the use of natural resources, "old timers" vrs. "newcomers", and growth vrs. no growth issues.

FIGURE 3-14
COMMUNITIES IN PROJECT AREA



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Community Services: The project area within the Bitterroot Valley has complete coverage for power, telephone, and cellular telephone service. Natural gas is not available, but many residents (especially in rural areas) use propane for heating and cooking. The major utilities make effective use of the US 93 corridor for main transmission lines both buried and overhead. Individual service lines and main branches cross the highway in many locations.

Incorporated communities of Hamilton, Stevensville, and Lolo all operate municipal water and wastewater systems. Victor has a water system and is considering installation of a wastewater collection and treatment system. Water and sewer service to rural users outside of the communities is based on individual water wells and septic tanks with drainfields for wastewater disposal.

Available emergency services are associated with the County and most communities. Municipal and volunteer fire departments are located either on or with quick access to US 93 in all the communities. The Highway is a major route of travel and means of access for all areas served. Law enforcement is provided by the Montana Highway Patrol, Ravalli and Missoula County Sheriff's offices, and local police in the larger communities. Ambulance service is available from Missoula, Lolo, Stevensville, and Hamilton. There is a hospital in Hamilton and also in Missoula approximately 22.5 km (14 mi) north of the project area.

Health and human services are provided by the County, local communities, and an integrated network of local support groups. The Bitterroot area has a very strong coordinated network of health and social services organizations with over 30 groups meeting on a monthly basis to share and exchange information regarding programs and services available. Community and senior citizen centers are located in Hamilton, Corvallis, Victor, Stevensville, Florence, and Lolo.

Kindergartens, elementary schools, and high schools are located in Hamilton, Corvallis, Victor, Florence, and Lolo. Junior high schools are located in Hamilton, Stevensville, and Lolo. All school districts operate bus routes that require travel and stops on US 93. Additionally, there are several locations (e.g. Florence) where pedestrian school children are required to cross the Highway. Several schools have indicated school bus access to and crossing of the Highway is beginning to become a major problem during periods of peak usage as are required pedestrian crossings.

Churches of many and various denominations are located in all of the communities and are readily accessible to all.

Proximity (Potential Displacement/Relocation): The lack of zoning and land use planning has resulted in some homes, businesses, or other buildings being located in close proximity to the existing highway in some locations. Elsewhere, a few such buildings existing at the time of the last highway improvement were "grandfathered" and allowed to remain close to the highway where the potential for impacts from future improvements is greater. Areas where these conditions presently exist can clearly be seen by reviewing the aerial photographs in Appendix A, and further discussion of the specific areas is given under the "Impacts" section for displacement/relocation in Chapter 4 of this document.

3.14 ECONOMICS

Commensurate with the strong growth currently being experienced in the Bitterroot, the area also enjoys a healthy economy. Retail trade and service head the list for type of employment with manufacturing and agriculture close behind. One of the greatest advantages the area has to offer is the ability to live in a rural lifestyle and commute to major centers such as Missoula and Hamilton for employment opportunities. This combination of lifestyle and economic opportunity, together with the scenic attractiveness of the area, are the primary factors contributing to its strong present and projected growth.

An economic report[11] was assembled from a study of area economic data including the Bitterroot Futures Study[14] conducted by the Bitterroot Valley Chamber of Commerce. Pertinent information from those sources is reviewed in the sections that follow.

Employment Climate: The economic health and stability of the Bitterroot Valley depend on employment opportunities more than any other factor. In the past the economy has boomed or busted based on the fate of certain employment opportunities. For example, early in the Valley's history fruit orchards were a big business and brought a large influx of people into the area. Later when other areas of the northwest began outproducing the Bitterroot, the local economy went bust.

A more recent example is the forest products industry. The Bitterroot area is known for its dependence on timber products, particularly the log home manufacturing business. Recent reductions in timber harvesting in the surrounding national forest (brought on by regulatory changes and environmental restrictions) have placed a serious burden on the timber industry which in turn adversely affects the area economy as a whole.

Many efforts are currently underway to diversify, expand, and solidify the area economy. The Bitterroot Valley Chamber of Commerce has made an extensive effort at identifying strengths and weaknesses and has developed a plan[15] for strengthening the economy into the future. This effort is mirrored by dozens of smaller economic groups associated with the various communities and areas in the Bitterroot. Table 3-11 summarizes the employment in the Bitterroot Valley according to the 1990 Census. Although the figures are in actuality those reported for Ravalli County, it should be considered as typical of the project corridor including the small section of Missoula County in the northern segment.

TABLE 3-11
EMPLOYMENT IN BITTERROOT VALLEY

Area of Employment	Number	Percentage
Agricultural/Forestry/Fisheries	1066	10.7
Mining	18	0.2
Construction	703	7.1
Manufacturing	1296	13.1
Transportation	572	5.8
Communications/Utilities	250	2.5
Wholesale Trade	249	2.5
Retail Trade	1739	17.5
Finance/Insurance/Real Estate	538	5.4
Services	3114	31.4
Public Administration	383	3.9
TOTAL	9928	100

According to the same census information, 17.4% of the workers in Ravalli County work outside the County. This is a strong indicator of the current trend to live in rural areas and commute to the larger business centers (Missoula) for employment. The Bitterroot Futures Study indicates that large chain discount and outlet stores in the Missoula area are providing stiff competition for retail businesses in the Bitterroot Valley. To answer that, local businesses are diversifying, particularly in the agricultural, wood products, technology, and communications industries.

There has been a dramatic increase in the number of home-based and cottage industries that have emerged in recent years. An average of 130 new businesses started up annually in the period of 1990 to 1992.

Despite the apparent strength of the economy in the area, there are still significant economic challenges. The downturn in the timber industry, previously mentioned, is a good example. During the six year period from 1986 to 1991 area unemployment averaged 9.4%; compared to Montana's 6.6% and the national 7.4%.

Like so many other areas, the Bitterroot is trying to diversify and strengthen its economy to provide an increase in employment opportunities for residents.

Housing and Income: Another indicator of the economic setting in the Bitterroot Valley is to look at the type and value of housing and also at personal income. Table 3-12 reviews the housing situation in Ravalli County according to the 1990 Census, which will be typical of that found in the project corridor. The majority of housing is in a rural location, but not associated with farmland. The mean value of housing units for Ravalli County is $65,663 compared to $72,100 in Missoula County to the north. The mean household size is 2.5 persons, similar to the rest of the State of Montana.

TABLE 3-12
RAVALLI COUNTY HOUSING

Housing (1990 census)	Number of Units	Percentage (%)
Urban	1476	13
Rural (farm)	572	5
Rural (non-farm)	9051	82
TOTAL	11,099	100
Occupied	9698	87
Vacant	1401	13
TOTAL	11,099	100

Mean Value = $65,663
Mean Household Size = 2.5 persons

Personal income is another means of examining the economic setting in the area. Table 3-13 reviews the annual household and per capita income figures for Ravalli County as obtained from the 1990 Census. Nearly half the households in the area make less than $20,000 per year and a full two-thirds are under $30,000 per year. The average per capita income figures shown in the table are 14% lower than the Montana average and 30% lower than the nationwide average.

TABLE 3-13
RAVALLI COUNTY HOUSEHOLD AND PERSONAL INCOME
(1990 CENSUS)

Yearly Household Income	Household Number	Household %
$ 0 - 10,000	1925	20
$10,000 - 20,000	2586	27
$20,000 - 30,000	1966	20
$30,000 - 40,000	1404	15
$40,000 - 50,000	793	8
$50,000 - 75,000	632	7
$75,000 - 100,000	182	2
$100,000 - 150,000	80	1
$150,000 +	40	<1
TOTAL	9608	100

Mean Household Income = $25,118 for Ravalli County
$28,050 for Missoula County

Per Capita Income = Ravalli County Mean = $13,125
State of Montana Mean = $15,304
United States Mean = $18,696

3.15 LAND USE

Perhaps the most intense and current social issue in the project area is the discussion concerning land use and growth. Time and again in public scoping meetings strong opinions were raised on "growth" vrs "no growth" issues and problems the area is experiencing due to lack of land use planning. Although efforts are currently underway to develop land use plans, the spirit of independence prevalent in the Bitterroot Valley leads many to resist government interference in general, and planning and zoning in particular. Others strongly feel the uncontrolled growth related to the current population expansion will bring even greater problems in the future without appropriate checks and balances being developed by local governments (land use planning).

Proper transportation planning requires careful coordination with, and support of, existing and proposed land use plans to achieve compatibility and avoid adverse impacts. A land use study[16] was conducted to identify existing land uses, current and projected efforts at land use planning, development control, and possible land use changes within the project area. The following subsections will summarize the important points of that study pertaining to land use.

Land Ownership: The 55.1 km (34.2 mile) project is located predominantly in Ravalli County (44.7 km) with a small portion on the northern end in Missoula County (10.4 km). Federal and State lands comprise 74% of Ravalli County; thus leaving 26% for private ownership. Most of these federal lands are associated with national forests and designated wilderness areas within the forests. Other federal landowners include Bureau of Land Management, Bureau of Reclamation, and the US Fish and Wildlife Service. Table 3-14 summarizes the typical land ownership and distribution within the Bitterroot Valley. The study corridor will be very similar in composition.

TABLE 3-14
TYPICAL LAND OWNERSHIP IN THE BITTERROOT VALLEY (%)

Land Type	Private	National Forest	State	% of all Land
Forest	16	82	2	61
Wilderness		100		16
Range	70	24	6	8
Crop	100			8
Residential/Commercial	100			1
Other *				6
TOTAL	26	71	3	100

* Includes transportation corridors, surface waters, wildlife areas. Ref: Bitterroot Futures Study

The Montana Department of Transportation owns a considerable amount of the right-of-way within the existing highway corridor. Table 3-15 shows the existing ownership by segments through the project and the corresponding land use types adjacent to the right-of-way in these areas.

TABLE 3-15
EXISTING MDT RIGHT-OF-WAY OWNERSHIP

Segment	Length (km)	Length (mi)	Existing R/W Width (m)	Existing R/W Width (ft)	Land Use Type
Hamilton to Silver Bridge	0.9	0.6	30.5	100	C
Silver Bridge to Bowman Road	0.6	0.4	30.5	100	C,R
Bowman Road to Sherman's Way	2.1	1.3	30.5	100	A,U
Sherman's Way to Woodside	1.2	0.8	42.7	140	C
Woodside to Mill Creek	4.3	2.7	42.7	140	C,R
Mill Creek to Tucker	1.8	1.1	51.8	170	A,U
Tucker Area	1.2	0.8	30.5	100	C
Tucker to Victor	4.1	2.6	39.6	130	A,R
Victor Area	0.9	0.6	30.5	100	C,R
Victor to Bell Crossing West	2.4	1.5	39.6	130	C,A,R
Bell Crossing to S. Kootenai Creek Road	8.1	5.0	48.8	160	A,U
Stevensville Y Area	1.9	1.2	51.8	170	C,R
N Kootenai Creek to Sweeney Creek Loop	9.4	5.9	51.8	170	A,U
Florence Area	0.7	0.4	45.7	150	C,R
E Side Highway to Carlton Creek Area	4.7	2.9	109.7	360	C,A,R
Carlton Creek Area	0.6	0.4	103.6	340	R
Carlton Creek Area to Mormon Creek Road	8.1	5.0	91.4	300	A,U
Mormon Creek Road through Lolo Area	0.5	0.3	73.2	240	I,C,R

KEY: I = Industrial C = Commercial A = Agricultural R = Residential U = Undeveloped

Current Land Use: Table 3-14 included a general description of the type of land use along the study corridor. The aerial photographs in Appendix A give a visual indication of current uses clearly showing rural versus developed areas. The Bitterroot Valley is currently experiencing very rapid growth and development that is already creating significant pressure for land use change. Land use planning and regulation efforts are currently underway (discussed hereafter), but currently land use in unincorporated areas is limited only by sanitation laws relative to septic system installation, review of proposed subdivisions by the County Planning Boards, and a few areas where voluntary zoning districts have been established. The following are more detailed descriptions by type of land use.

- Residential: In the recent past, new residential development in the area has been characterized by a dispersed development pattern with a significant amount of residential development in rural areas. The small communities of Hamilton, Victor, Florence, Stevensville, and Lolo continue to be population and business centers but account for decreasing shares of the area's total population as a strong tendency to locate residences in the less crowded rural areas occurs.

  Accordingly, residential development in the rural areas has intruded on farmland and vacant areas, displaced wildlife habitat, and degraded water quality.

  Another driver of current residential development is the tendency for those working in Missoula to live in "bedroom" communities within the project corridor. The telephone survey conducted for this study revealed the average commuter travels 38 km (23.6 mi) in about 32 minutes traveling time. This implies that nearly half the project corridor is currently within "reasonable" commuting distance of Missoula. For example, Stevensville's population (45 km [28 mi] from Missoula) increased 9.7% from 1990 to 1992.

Another indicator of current trends in residential land use is the number of subdivisions platted in currently vacant and undeveloped areas. As shown in the section on future land use (Figure 4-5 in Chapter 4.0), a tremendous percentage of land within the project corridor has already been platted or proposed for eventual residential development. Current pressures for this type of development come from the "bedroom" commuting concept and the reasonable affordability of property in this aesthetically attractive area which has enticed many to relocate to the area.

Bedroom commuting has resulted in increased traffic volumes on US Highway 93 and decreases the efficiency of the facility.

- Commercial: Most of the economic growth in the Bitterroot Valley is occurring in the retail and service type of businesses. Primary locations for these commercial developments are located along the highway within the existing communities. However, the lack of access control and land use planning policies has resulted in "strip growth" beginning to occur on the outskirts of the communities and sometimes in between. Extensive strip growth patterns are already evident between Hamilton and Woodside and around the Stevensville Y-intersection. Much of the strip growth is oriented to highway services such as gas/convenience stores and restaurants.

  The affordability of ground in the rural areas has also invited commercial developments to become established along the highway corridor between the communities. There are several locations where log home manufacturing facilities, sand and gravel pits, nurseries, and other similar commercial activities needing plenty of space have developed. The dispersed commercial development along US Highway 93 has contributed to the growth of traffic and the complexity of turning movements which decreases highway capacity and increases accident potential.

- Industrial: The Bitterroot Valley's major industrial employers where historically located along the Burlington Northern Railroad corridor. Industrial opportunities have lately been expanding in the wood products, technology, and telecommunication fields. The decline in the use of the railroad and the current dependence on semi-truck traffic for transportation of industrial goods has led to a decline in heavy manufacturing and an increase of light industrial uses located along or near the highway. As with commercial growth, the economic availability of large tracts of property in the rural and undeveloped areas also appeals to the industrial community.

- Agricultural: Out of approximately 111,300 hectares (275,000 acres) of farmland in the Valley, there are 9,540 hectares (23,571 acres) of irrigated prime farmland and 1,900 hectares (4,700 acres) of farmland of state-wide importance. Most agricultural operations are 4 to 20 hectares (10 to 50 acres) in size. However, there are several large operations of over 810 hectares (2,000 acres).

  Currently there is a trend for conversion of large farming units into multiple mini-farms. These smaller farming units are purchased for hobby farms, tax shelters, and/or for land speculation purposes. Considerable pressure also exists to convert agricultural lands to non-agricultural uses such as residential, commercial, and industrial development.

Access Control: Control of access onto a major highway such as US 93 can have a substantial effect on the use of adjacent land. Restrictive access tends to discourage the development of land and protect undeveloped areas by encouraging potential development to look elsewhere where easier access is available. Conversely, a permissive access control policy encourages development, including densification of existing development areas if sufficient access is available. Situational access control calls for a case-by-case review, which could support either of the foregoing or some situation in between.

Unfortunately, little or no access control currently exists within the project corridor. MDT does have a standard approach policy that limits the size, frequency, and location of approaches with respect to property lines, intersecting roads, etc. However, these controls are not very restrictive and just about anyone can obtain permission for an access anywhere along the highway with reasonable justification. The lack of

effective access control, coupled with the lack of land use planning in the area, has led to a "free for all" in terms of development patterns.

Land Use Planning: In response to this basically uncontrolled growth, local governments have recently initiated major land use planning efforts.

The northernmost portion of the study corridor near Lolo (Missoula County) is the only area with an official land use plan. In general, this plan establishes areas for industrial, commercial, multi-family residential, residential, open and resource land, parks and open space, and public and quasi-public uses. Ravalli County adopted a comprehensive plan in 1981 that has been periodically updated, but is not considered adequate to meet the demands from the considerable growth pressure being experienced. Ravalli County does have approximately 28 small independent, voluntary zoning groups that have been created by petition of the residents in neighborhoods to provide guidance for zoning in those districts. Otherwise, general land use in unincorporated areas of the County is limited only by sanitation laws and review of the planning board for subdivision requests.

Ravalli County has recently moved forward with the establishment of a new Comprehensive Plan[12] to begin to control growth and define land use. The plan recognizes that urban sprawl is generally one of the development patterns that occurs in the absence of guidance for land use. Urban sprawl is characterized by scattered, untimely, and poorly planned development in rural areas that ends up being costly and inefficient for governments, residents, and taxpayers alike to provide needed services. The objective of the new comprehensive plan will be to create a land use policy that will encourage community-centered growth while maintaining the rural character of agricultural and undeveloped land in the County.

The document, currently in draft form, identifies the following land use districts:

- **Residential**
  - high density
  - medium density
  - low density
  - agricultural/rural
- **Commercial**
  - community
  - cross roads
  - convenience
- **Mixed Use**
- **General Industrial**
- **Public Resource Lands**

The Draft Comprehensive Plan for Ravalli County was assembled after a series of public scoping meetings identifying the issues and general desires of the local citizens. Currently the draft has been reviewed by agencies and is being presented to the general public for review and comment. It is anticipated a final Plan will be adopted within the next year.

The Land Use Plan in effect in Missoula County is providing for more orderly and controlled growth and development. New developments are following the designations for types of land use made in the Plan and proposals for development are being reviewed by a County Planning Board to assure consistency with the Plan. Not much change in this pattern is anticipated unless residents of a given area were to organize themselves and petition for changes or amendment of the Land Use Plan.

3.16 FARMLAND

A Farmland Impacts Study[17] was conducted to investigate farmlands and the potential impacts of project alternatives on them. The study identifies approximately 11,300 hectares (275,000 acres) of farmland in the

Valley, approximately 10%, 9,540 hectares (23,571 acres), of which is prime farmland and 1.7% (1,900 hectares [4,700 acres]) is farmland of state-wide importance. These determinations are made predominantly from soil type as identified by the Soil Conservation Service District, which has maps delineating soil types throughout the Valley. According to the Hamilton SCS Field Office, unique or locally important farmlands have not been established in the project area. The existing project corridor traverses through farmland areas, including a few localized areas of prime farmland and also farmland of state-wide importance.

The Farmland Protection Policy Act of 1981 (FPPA) was established to minimize the extent to which federal projects contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. The Act refers to "farmland" as land in any of the following four different categories:

- <u>Prime Farmland</u> - farmland capable of providing significant production by virtue of its physical, chemical, and hydrologic characteristics

- <u>Unique Farmland</u> - an area of soil conditions unique to and necessary for the production of a certain type of crop

- <u>Farmland Other Than Prime or Unique of Statewide Importance</u> - land significant to the statewide economy through production of important crops

- <u>Farmland Other Than Prime or Unique of Local Importance</u> - land significant to the local economy through production of important crops

Table 3-16 gives the locations and associated length of prime and farmland of state-wide importance as they occur along the project corridor. Visual representation can be obtained by locating the area listed on the aerial photographs in Appendix A.

TABLE 3-16
LOCATION OF PRIME OR IMPORTANT FARMLAND

Segment/Milepost	Farmland of Statewide Importance	Prime Farmland
Hamilton - Victor		
None	---	---
Victor - Florence		
68.4 to 68.4	X	
69.2 to 69.4	X	
Florence - Lolo		
79.2 to 79.2		X
79.4 to 79.6	X	
79.6 to 79.7		X
80.2 to 80.3		X
80.6 to 80.7		X
82.0 to 82.1		X
82.3 to 82.4		X
82.4 to 82.4		X
82.5 to 82.7		X
82.7 to 82.9		X

3.17 TRANSPORTATION

This section provides a general overview of existing transportation systems and facilities in the study area. This includes information about the existing highway, traffic, capacity, efficiency of service, safety, and other similar factors in relation to current conditions. Some data appropriate to this section was already discussed in detail in Chapter 1, "Purpose of and Need for Action". To avoid unnecessary repetition, highlights of that material are summarized here; greater detail can be obtained from Chapter 1.

Transportation Modes: US 93 is the major transportation link in the area, providing not only for highway interconnection, but also to other forms of transportation for people and goods.

The Missoula Airport offers major commercial airline flights connecting to points throughout Montana and to other major airline hubs in the United States where access to international air travel is available. Three major carriers serve the airport in addition to numerous charter and air freight operations.

Missoula is a major railroad switching center, providing freight service to the rest of the Country. Freight service is offered by Montana Rail Link (MRL), who also operates the railroad line south into the Bitterroot Valley and the project corridor. Passenger service to the area is offered by AmTrak, but the closest stop is in Whitefish, 120 miles north of Missoula.

Bus service is available, centered primarily in Missoula. Service from a national carrier offers connection to other parts of Montana and the United States. A local urban transportation bus system provides access within the metropolitan area of Missoula and public bus lines have occasionally offered service through the study area between Missoula and Hamilton. Ridership on these lines was low and the economics were such that the operations were abandoned. Currently, there is no bus service within the corridor. Taxi service is available in the Hamilton and Missoula areas; basically serving both ends of the study corridor. Taxi service to other points within the corridor from these two bases is available, but at considerable expense.

Pedestrian and bicycle facilities exist within the communities in the corridor and are particularly associated with the City of Missoula and access to the University of Montana. The north end of the project corridor offers easy bicycle commute to the City of Missoula and many take advantage of this opportunity during good weather. US 93 is also a prominent link in a transcontinental bike path being promoted by bicycle organizations for recreation and tourism.

US 93 is also an important highway link connecting the Bitterroot Valley with the rest of the State and national and international highway systems. As such, it has been made a part of the National Highways System. Section 1.3 described the linkage of Highway 93 in the study area to other highway transportation systems in the region. Figures 1-1 and 1-2 presented mapping to visualize the role of US 93 in regional and local highway transportation systems.

Existing Highway Facilities: US Highway 93 is predominantly a 2-lane facility throughout the length of the project corridor. In selected areas of urban concentration such as North Hamilton, Woodside, Victor, Stevensville Y-intersection, and Florence, the highway has been expanded to 4-lanes (2 each direction) or 5-lanes (center turning lane) to facilitate access, reduce congestion, and improve safety for turning movements. Elsewhere in the project corridor US 93 has turning lanes at major intersecting County roads to provide greater safety.

With the exception of the urban concentrations just mentioned, the highway is typically in a rural setting with generally flat terrain punctuated by occasional rolling hills, moderately deep drainages, and other similar geologic features. Speed on the highway is posted at 55 mph (90 kph) except in the short urban segments where limits are posted at 45 mph (70 kph) for volume and safety reasons. With a few minor exceptions, most of the corridor has approximately 20% "no passing" zones.

The existing highway in the corridor was constructed in several segments at various times as given in Table 3-17. Most of the highway is 40 to 60 years old with no major improvements since initial construction other

than some overlay, maintenance, or safety projects. Recently a signing and pavement marking improvement project was completed from Hamilton to Missoula.

TABLE 3-17
US HIGHWAY 93 CONSTRUCTION BACKGROUND

Milepost Segment		Length		Width		Year Built	Year Overlay	Other Improvements
To	From	(km)	(mi)	(m)	(ft)			
49.2	49.7	0.8	0.8	9.1	30	1939	1952, 1982	
49.7	59.0	15.0	9.3	7.6	25	1952	1982	
59.0	73.5	23.3	14.5	9.7	32	1956	1961	seal coat 1962
73.5	74.3	1.3	0.8	13.4 to 20.7	44 to 68	1975	---	
74.3	74.8	0.8	0.5	20.7	68	1975	---	
74.8	83.2	13.5	8.4	11.0	36	1975	---	

The Geotechnical Reconnaissance Study[18] reports on the pavement conditions throughout the corridor including areas where there is cracking, rutting, patching, or other deformations. In general, the existing pavement section shows minor to moderate rutting throughout the project corridor. Additionally, present pavements are moderately deformed causing a slight rolling ride surface. Considering the pavement ages and history, the existing road section should be considered stable and in a moderate to fair condition.

Deterioration is likely a result of several factors:

- inadequate surfacing section and/or foundation soils (limited strength)
- heavy traffic loads (weight of vehicles)
- high traffic volume (fatigue of pavement)
- age of materials (degradation and wear)
- proximity to high watertable or lack of adequate drainage (saturation and reduction of strength)

These conditions are prevalent at various locations and in varying degrees throughout the study corridor. Table 1-8 in Chapter 1.0 reviewed the corridor with respect to pavement condition.

Geometric conditions have also been inventoried and compared with present standards. Table 3-18 summarizes current deficiencies with regard to horizontal and vertical alignment, narrow bridges, steep sideslopes, and other geometric concerns.

TABLE 3-18
EXISTING HIGHWAY GEOMETRIC DEFICIENCIES

Location Milepost	Sharp Curve	Steep Grade	Vertical Curve	Narrow Bridge	Steep Sideslope	Narrow Shoulders	Mailbox Turnouts
49.2 to 83.2					X	X	X
49.5				X			
49.7	X						
49.8				X			

50.3				X			
50.8				X			
54.5				X			
56.7				X			
59.8				X			
61.6				X			
65.0				X			
66.0				X			
69.8		X	X				
74.9	X			X			
79.9	X						
82.9				X			

Numerous bridges and culverts accommodate surface water flowing predominantly from west to east under the highway. Table 3-18 showed the location of all major bridges on the project. The largest is the bridge over the Bitterroot River just north of Hamilton (milepost 49.5), which is a 100 m (392 ft) span. Other bridges are commonly in the 12 to 20 m (40-60 ft) span range. Numerous culverts, including several large diameter structural steel plate pipes provide passage for smaller streams.

Intersections are provided for all major County roads intersecting with US Highway 93 through the corridor. Those carrying a higher volume of traffic are provided with dedicated turning lanes. Numerous private and commercial approaches also come off the highway throughout the corridor. The density of these approaches ranges from a low of 1.2 per km (2 per mi) in undeveloped rural areas to as high as 31 to 37 per km (50 to 60 per mi) in the "urbanized" areas. Currently there is no access control policy other than applying for permits for approaches from MDT.

Traffic control in the corridor is provided by signing and pavement markings. There are no signals or stop signs on the Highway 93 mainline. Intersecting County roads all have stop signs for traffic control. A signing and pavement marking project was completed in 1994 to upgrade US 93 to current signing and marking standards from Hamilton to Missoula. Pavement parkings on the highway are renewed annually as a part of routine maintenance operations.

Existing rights-of-way vary from a minimum of 27 m to a maximum of 76 m (90 to 250 ft) depending on location in the corridor. The segment from Florence to Lolo, having been constructed more recently, has a wider right-of-way that was acquired in anticipation of the eventual need to construct additional lanes.

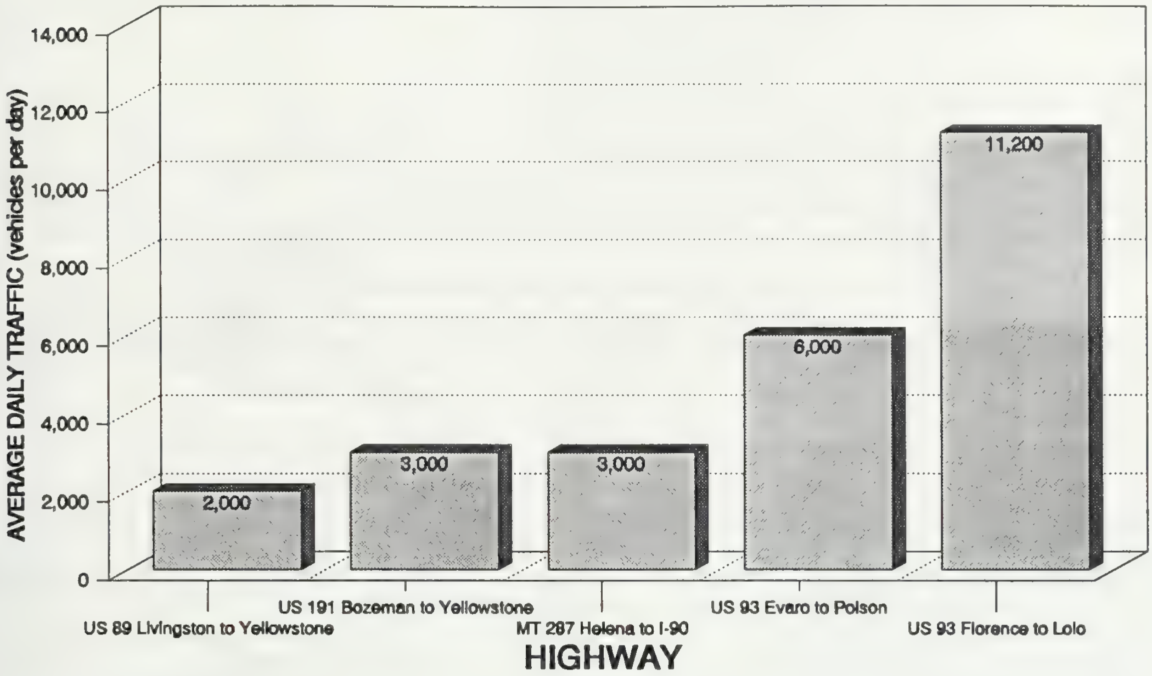
There are no "at grade" railroad crossings along US 93 within the study corridor. It should be noted that the Montana Rail Link railroad line parallels the existing highway on the east side from Florence northward to Lolo (milepost 70.2 to 82.0). In many locations the railroad is immediately adjacent to the highway, but any impacts associated with the presence of the railroad will all be associated with cross streets and approaches.

The existing highway is physically deficient in many respects. Section 1.8 of Chapter 1 provided specific information on several types of deficiencies associated with the existing roadway. Figure 1-11 in Chapter 1.0 presented photographic examples of these roadway deficiencies.

Traffic: US Highway 93 is functionally classified as a "principal arterial" and has been included as part of the National Highway System recently established and adopted by Congress. Accordingly, the facility carries appreciable traffic. In fact, this portion of the highway in the study corridor carries a significantly higher traffic

volume than any other rural 2-lane highway in the State of Montana. Figure 3-15 vividly illustrates this disparity by comparing US 93 to the next most travelled rural 2-lane highways in the State.

FIGURE 3-15
TRAFFIC ON 2-LANE RURAL HIGHWAYS IN MONTANA



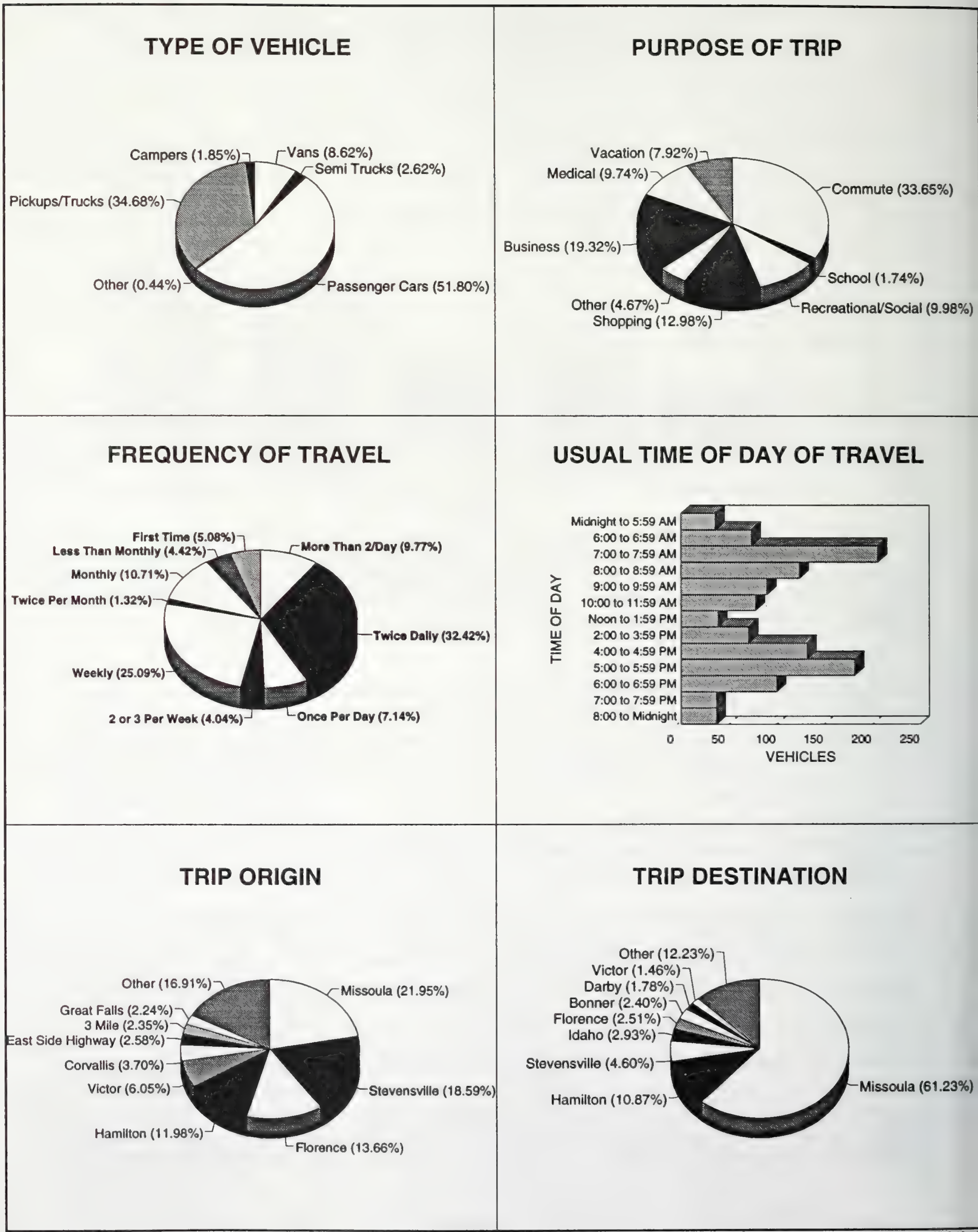
A traffic survey[19] was taken on the highway to determine the characteristics of traffic and vehicles utilizing US 93 in the study corridor. The report of the Traffic Survey is quite extensive in providing information concerning the following:

- type of vehicle
- number of passengers
- characteristics of driver
    - age
    - gender
    - county of residence
    - educational level
    - income
    - occupation
- purpose of trip
- frequency of travel
- time of travel
- origin and destination
- other miscellaneous travel information

Figure 3-16 is a collection of the most meaningful statistics defining the character of travel on US 93 in the study corridor.

As illustrated in Figure 3-16, just over half the traffic consists of passenger vehicles; 43% were pickups, vans, or small trucks; and about 3% were tractors and trailers. The predominant purpose of traveling is commuting or business oriented (63%) with nearly one-third (32%) making the trip twice daily. As expected, the peak times of travel were 7:00 to 9:00 a.m. (27%) and 4:00 to 6:00 p.m. (26%), which reflect the "commuter" characteristic of the majority of travel. Two-thirds of the traffic (67%) originated in the project corridor with

FIGURE 3-16
U.S. 93 TRAFFIC CHARACTERISTICS
IN STUDY CORRIDOR



an approximate equal percentage indicating a destination within the project corridor (including Missoula which was 61% of the designated destination).

As an indication of the substantial traffic volumes and congestion being experienced in the corridor, particularly during the commute periods, the survey indicated 42% of the travelers had changed their time of travel on a prior occasion due to a highway condition other than weather. Nearly 98% of those who had changed indicated it was due to "too much traffic" or to "avoid rush hours".

All of the study corridor carries as much or more traffic than any other rural 2-lane roadway in the State of Montana. Table 3-19 reports the existing traffic volumes for US 93. As discussed in Chapter 1, US 93 is the only primary route through the Bitterroot Valley. This means that traffic must use this highway at some point in the corridor (e.g., Florence to Lolo) whether or not it is congested. Past growth of the area has created the current demand and forecasts of continued growth will bring a proportional traffic increase.

TABLE 3-19
EXISTING TRAFFIC VOLUME FOR US 93

Segment	Existing ADT
North of Hamilton	9,820
Woodside	9,130
Victor	6,160
Stevensville "Y"	6,620
Florence	7,370
Lolo	11,240
Missoula Limits (beyond study corridor)	21,170

Capacity: The capacity of the highway is determined by the number of vehicles that can safely and efficiently be moved through an area in one hour. If all of the daily traffic were spread out over a 24 hour time period, then capacity would not become so much of a problem. However, demand on the highway is very high during the hours associated with morning and evening commutes (especially in an area with a such high percentage of commuters).

National standards[20] indicate the absolute maximum capacity of a 2-lane rural highway, such as US 93 in the study corridor, is 2,800 passenger cars per hour (pcph) total in both directions. However, traffic at maximum capacity is quite unstable and subject to a higher accident rate; therefore the recommended capacity is 1,200 pcph total in both directions.

The same national standards suggest that the demand on the facility (called design hour volume [DHV]) to be used for comparison to the capacity of the highway be the 30th highest hourly volume observed during a given year. This assures reasonableness and practicality by eliminating unusual special events such as county fairs, construction disruption, etc., that may cause appreciable but rare increases in the hourly traffic volume. Table 3-20 presents the capacity analysis for the major segments of US 93 within the study corridor and reveals several areas where present capacity is already exceeded during the design hour.

TABLE 3-20 EXISTING DEMAND AND CAPACITY FOR US 93		
Segment	Existing DHV	% of Recommended Capacity
North of Hamilton	1,470	123%
Woodside	1,370	114%
Victor	920	77%
Stevensville "Y"	990	83%
Florence	1,110	92%
Lolo	1,690	141%
Missoula Limits	3,180	48% *
* Note: 4-lanes at this location, capacity = 6600 pcph		

Level of Service: The capacity issue is used to determine the "level of service" (LOS) offered by the highway under a given condition. Much the same as reporting how well a student performs assignments in school, the LOS of a given segment of highway is assigned a grade A through F commensurate with how well the capacity available matches with the demand placed on it. Figure 1-4 (Chapter 1) describes the level of service for grades A through F along with pictures showing typical traffic conditions associated with these levels.

According to current MDT Design Guidelines[21], a primary rural arterial with terrain similar to this corridor should be designed for a 20-year life at LOS B. Table 3-21 shows existing level of service for the principal segments of the highway within the study corridor. The table indicates that all portions of the existing highway currently exceed the recommended LOS and the northerly most portion (Lolo) is already at maximum capacity during periods of peak traffic flow.

TABLE 3-21 EXISTING US 93 LEVEL OF SERVICE BY SEGMENT	
Segment	Existing LOS
North of Hamilton	E
Woodside	D
Victor	C
Stevensville "Y"	D
Florence	D
Lolo	E

A similar analysis can be made of major intersections with US 93 within the corridor. The capacity of the intersections is determined by looking at the traffic flow on the main road and the side street, the geometry of both roadways, the type of terrain, and the degree of traffic control at the intersection (traffic signal, stop sign, yield sign, etc.). Table 3-22 reviews the existing LOS conditions at major unsignalized intersections in the corridor, showing that several already need attention.

TABLE 3-22 EXISTING LEVEL OF SERVICE AT MAJOR INTERSECTIONS		
Location (Milepost)	Existing LOS	
	Westbound	Eastbound
Woodside Crossing (52.0)	C	B
Victor 3rd Avenue (59.0)	B	B
Bell Crossing (61.1)	B	B
Stevensville "Y" (66.8)	C	---
Bass Creek Road (70.4)	---	B
Sweeney Creek Loop (73.0)	A	B
Eastside Highway (Florence) (74.8)	B	C

Safety: Section 1.6 reviewed the accident history within the study corridor. Although there is a high rate of accidents (average of 114 per year), only animal accidents and dark/dusk conditions exceed the state-wide averages. Table 3-23 presents a summary of five years of data on accidents occurring in the study corridor.

TABLE 3-23 ACCIDENTS IN STUDY CORRIDOR - 7/87 TO 6/92			
Type of Accident	# Occurring	Local %	State Wide Average
Truck Accidents	40	7.0%	12.0%
Overturning Accidents	75	13.2%	21.0%
Animal Accidents	100	17.5%	10.8%
Icy/Snowy Conditions	108	18.9%	27.4%
Dark/Dusk Conditions	241	42.3%	35.8%
Other	6	1.1%	---
TOTAL	570	100%	---

Section 1.6 contained information on a statistical breakdown of fatalities and injuries associated with these accidents. Specific examination of the accident data showed nearly twice the number of accidents occuring where there is a high degree of development along the highway, particularly where major traffic feeders intersect US 93. The incidence of angle collisions and rear-end collisions both exceed statewide averages (25.4% angle - 15.3% statewide; 16.7% rear-end - 13.8% statewide). These are likely associated with a high degree of turning movements and the appreciable degree of congestion occurring on the facility.

As noted earlier in this section, other safety concerns related to inadequacies of the existing facility include sharp curvature, narrow bridges, steep sideslopes, narrow shoulders, and inadequate mailbox turnouts. Some contribute to increased accident potential since they limit the area available to safely avoid collisions or obstructions. Others such as steep sideslopes may contribute to an increase in accident severity.

Another concern is the high number of approaches in some areas generating an appreciable degree of cross traffic and turning movements. Some approaches have steep grades, sharp angles of intersection, or limited sight distance, all of which can diminish safety.

The greatest safety concern of those using the highway relates to animal accidents. Over 500 deer per year are killed annually in the Bitterroot Valley resulting in property damage estimated to exceed $700,000 per year. The occurrence of animal collisions is widespread throughout the corridor and does not appear to be associated with game trails or other specific circumstances.

Pedestrian and Bicycle Facilities: Walking and bicycling are becoming increasingly popular alternatives to automotive and public transportation. These activities offer environmentally responsible transportation as well as a way to increase personal physical fitness.

When completing the traffic study for the US 93 corridor, the residents of the Valley and users of the highway were surveyed to determine their feelings toward transportation facilities. The results of the survey give a good indication of the public's perception, attitude, and usage of bicycle and pedestrian facilities. The traffic survey indicated 22% felt the lack of bike paths was a problem. Indications of possible solutions to transportation problems in the corridor included wider shoulders (26%) and sidewalk/bike paths (20%). In the telephone survey, 59% cited lack of bike paths as a moderate to serious problem; 33% gave a similar indication for lack of sidewalks; and 44% and 41% indicated that wider shoulders and more sidewalks, respectively, would improve conditions significantly.

Notwithstanding the high percentage of respondents discussing pedestrian and bicycle facilities, the surveys indicated less than 1% currently commute by bicycle. It is unclear whether this limited use of bicycle facilities is due to personal transportation preferences or lack of facilities. The high rates of response in the surveys seem to indicate that the lack of pedestrian/bicycle facilities is viewed as a problem in the corridor and improvements are needed.

A report prepared on pedestrian/bicycle facilities[22] generalizes that bicycle and pedestrian facilities in the Bitterroot Valley are very limited although most of the towns have sidewalks for pedestrians. There is a bike path in the Hamilton area. However, according to the Missoula Chapter of the Bicycle Federation of America, this bicycle path was not built to the 1991 AASHTO Standards as published in the *Guide for Development of Bicycle Facilities*. It is bi-directional, very narrow, and has no barrier separating it from the busy highway.

Neither is the existing Highway 93 bicycle or pedestrian "friendly". The 0.6 to 1.2 m (2 to 4 ft) shoulders are very narrow and do not meet the standards cited, which require 1.2 m (4 ft) of separation between automobiles and bicycles before the pathway begins. There is a lack of signing pertaining to pedestrian and bicycle activities and intersections are difficult to cross due to heavy traffic.

The Bicycle Federation indicates two main types of bicycle usage in the Valley. The first is localized use generally within a community. For the most part, facilities presently exist to accommodate these needs. The second type involves distances greater than 8 km (5 miles), which usually includes transportation between communities. Although such usage is presently very low in the study area, indications are that provision for pedestrian/bicycle facilities would create a corresponding increase in demand. US 93 is also an important link in the proposed transcontinental bicycle route, further supporting the need for bicycle facility improvements.

Transportation Plans: The proposed Ravalli County Comprehensive Plan recognizes the function of US 93 as the primary arterial through the Valley. The Plan calls for protection and enhancement of this transportation resource, incorporating land use provisions and access control as means to protect its functions, both in providing efficient traffic movement and local access according to current established land use patterns. At the same time, the report recognizes and calls for improvements of the facility to provide greater capacity to meet present demands and anticipated future growth.

Similarly, the Missoula County Comprehensive Plan recognizes the importance of US 93 as the main southerly arterial into and out of the City of Missoula. With extremely high traffic counts (20,000 to 30,000 vpd), the protection of this arterial for safe and efficient traffic flow while minimizing congestion and access demand are very important. The southern fringe of this arterial within Missoula County constitutes the northerly 10.3 km (6.4 miles) of the study corridor.

Lastly, the Bitterroot Futures Study[14] recognizes the importance of US 93 as a major transportation facility and recommends special consideration in preserving and upgrading its function and efficiency to provide for and support area economic development plans.

Any proposed transportation improvements in the study area must be consistent with the recommendations, goals, and objectives of these transportation plans to support local government efforts for managing growth while preserving local resources and lifestyle.

3.18 HISTORIC RESOURCES

A Cultural Resources Inventory Report[23] inventorying both historical and cultural resources in the study corridor was conducted. The work was accomplished by a combination of extensive literature search in many libraries and with several historical society organizations combined with a thorough field review of the project area. This field review consisted of walking serpentine transects for 60 m (200 ft) on either side of the road. Resources discovered were thoroughly mapped, photographed and described in written detail for inclusion in the report. Basic background information and a description of the resources inventoried follows.

Historic Background: The prehistory of this area is discussed under 3.19 - Cultural Resources. Extensive use of the Bitterroot Valley by Native American cultures for settlements, hunting grounds, and important trading and transportation trails made it a naturally attractive area for the earliest explorers to the region.

Following such trails, the famed Lewis and Clark Expedition arrived in the Bitterroot Valley in September 1805. In a basin later to be called Ross' Hole, they came upon a group of Native Americans in route from their permanent valley homes to hunt buffalo in the country east of the mountains.

The Lewis and Clark party continued down the river camping at three sites; one near Grantsdale, one near what became Fort Owen, and one near the mouth of Travelers Rest Creek (now known as Lolo Creek) where they spent several days prior to heading west through Lolo Pass. Approximately nine months later the party was again at Travelers Rest where Lewis and Clark then separated to explore different routes on their return trip to the east.

Travelers Rest is known to have been established at the mouth of Lolo Creek where it empties into the Bitterroot River. This site is several hundred meters east of the north end of the project corridor. A highway pullout and historical information sign are presently located on the east side of the highway just south of Lolo Creek to commemorate the historical activity that occurred there.

The trails and passes through the Bitterroot Valley were used by the Nez Perce, Shoshoni, Pend'Orielle, Salish Flathead, Kootenai, and Blackfeet Native American tribes during the 18th and 19th centuries. These routes received additional usage with the arrival of explorers, trappers, traders, and settlers. In 1877 Nez Perce Chief Joseph and his people traversed the length of the Bitterroot Valley on their famous "Trail of Tears" effort to escape US Government intervention and flee to Canada. Several of these early routes through the Bitterroot have been modernized and continue to be used by travelers today.

In 1841 Saint Mary's Mission was established by the Jesuits. In 1850 Major John Owen took over the mission and created a successful trading post. Along with the establishment of Fort Owen came road construction and an influx of settlers to the area. In the 1870's the US Government forced Native American communities to move north to the Jocko River area, which opened the Bitterroot for extensive homesteading in the 1880's.

The area soon became an important agricultural center, providing food and staples to mining camps within the region. Extensive irrigation facilities were constructed and large apple orchards were developed in the early 1900's. Since then, the area has depended primarily on agricultural production and the logging industry; the Bitterroot is known as the log home capital of the world.

The old stage coach road was built in 1867 south from Missoula to a site that later became Grantsdale (just south of Hamilton). Much of the road was established on the route now followed by Highway 93. Construction of Highway 93 began in 1928. It followed old roads south from Missoula and then from Kenspur (south of Florence) it followed the old railroad bed. In the late 1960's, Highway 93 was rerouted from Lolo to Florence.

Criteria for Historic Preservation: Once potential historic resources were identified within the corridor, each was investigated as to eligibility for inclusion on the National Register of Historic Places (NRHP). For an individual property to qualify for listing on the NRHP, it must be associated with an important historic context and retain sufficient historic integrity to convey its significance. The criteria upon which an evaluation of such significance is based are as follows:

- Criterion A - Those associated with events that have made a significant contribution to the broad patterns of history. Mere association with historic events or trends is not enough in and of itself, the property's specific association must be considered important as well.

- Criterion B - Those associated with lives of persons significant in our past.

- Criterion C - Those that embody distinctive characteristics of a type, period, or method of construction; or that represent the work of a master; or that possess high artistic values; or that represent a significant and distinguishable entity whose components may lack individual distinction.

- Criterion D - Those that have yielded, or may be likely to yield, information important in prehistory or history.

Properties discovered during research and field review of the corridor to have potential for historical significance were identified and evaluated in accordance with these criteria for potential inclusion on the NRHP. Coordination with the State Historic Preservation Office was made to determine site and feature eligibility. The next section summarizes the results.

Historic Properties: Ten historic sites were identified within the survey corridor in Ravalli County. Nine of those are not eligible for listing in the NRHP. Two individual buildings (a brick residence in 24RA459 and a vernacular dwelling in 24RA460) are eligible under Criterion C for their architectural value, but the sites in which they are located as a whole are not eligible. A segment of the Bitterroot railroad grade (24RA271) is eligible under Criterion A for its direct association with the economic development of the Bitterroot Valley. The historical remnants of the Bitterroot Pea Factory are outside the limits of any potential impact; thus no eligibility determination was made.

In Missoula County five historic sites were identified within the survey corridor. Travelers Rest (24MO176) is already designated as a National Historic landmark. Site 24MO357 a historic homestead is eligible under Criterion A for its direct association with early land settlement in the Bitterroot Valley in the late 19th century. Two buildings within this homestead (a log barn and a wood pinned barn) are considered individually eligibly under Criterion C. Lastly, a segment of the Bitterroot Railroad (24MO359) is also eligible for listing under Criterion A due to its direct association with the economic development of the Bitterroot Valley. Two other historic sites (24MO356 and 24MO358) are not eligible for listing in the NRHP.

There are a few old irrigation ditches in the study corridor. Their status and treatment is covered under a programmatic agreement between the Montana Department of Transportation and the State Historic Preservation Office, which stipulates that "irrigation ditches not identified by name in the appropriate Montana Water Resources Survey publication will not be considered under any circumstances". Since these ditches are unnamed and do not appear to be part of any larger named system, no further consideration is required.

The Silver Bridge Crossing of US 93 over the Bitterroot River is over 50 years old and would normally be considered for potential eligibility for the NRHP. However, another programmatic agreement exists between MDT, FHWA, the Advisory Council on Historic Preservation, and SHPO which states that only such bridges

specifically included on a potential resource list cooperatively established by the SHPO and local governments qualify for consideration of eligibility for the NRHP. Since Silver Bridge does not appear on the established list, no further consideration is required.

Figure 3-17 presents the location of those properties just identified as either being already listed or eligible for listing on the NRHP. Table 3-24 is a summary of all the historic properties in the study corridor and their eligibility status.

TABLE 3-24
HISTORIC PROPERTIES IN THE STUDY CORRIDOR

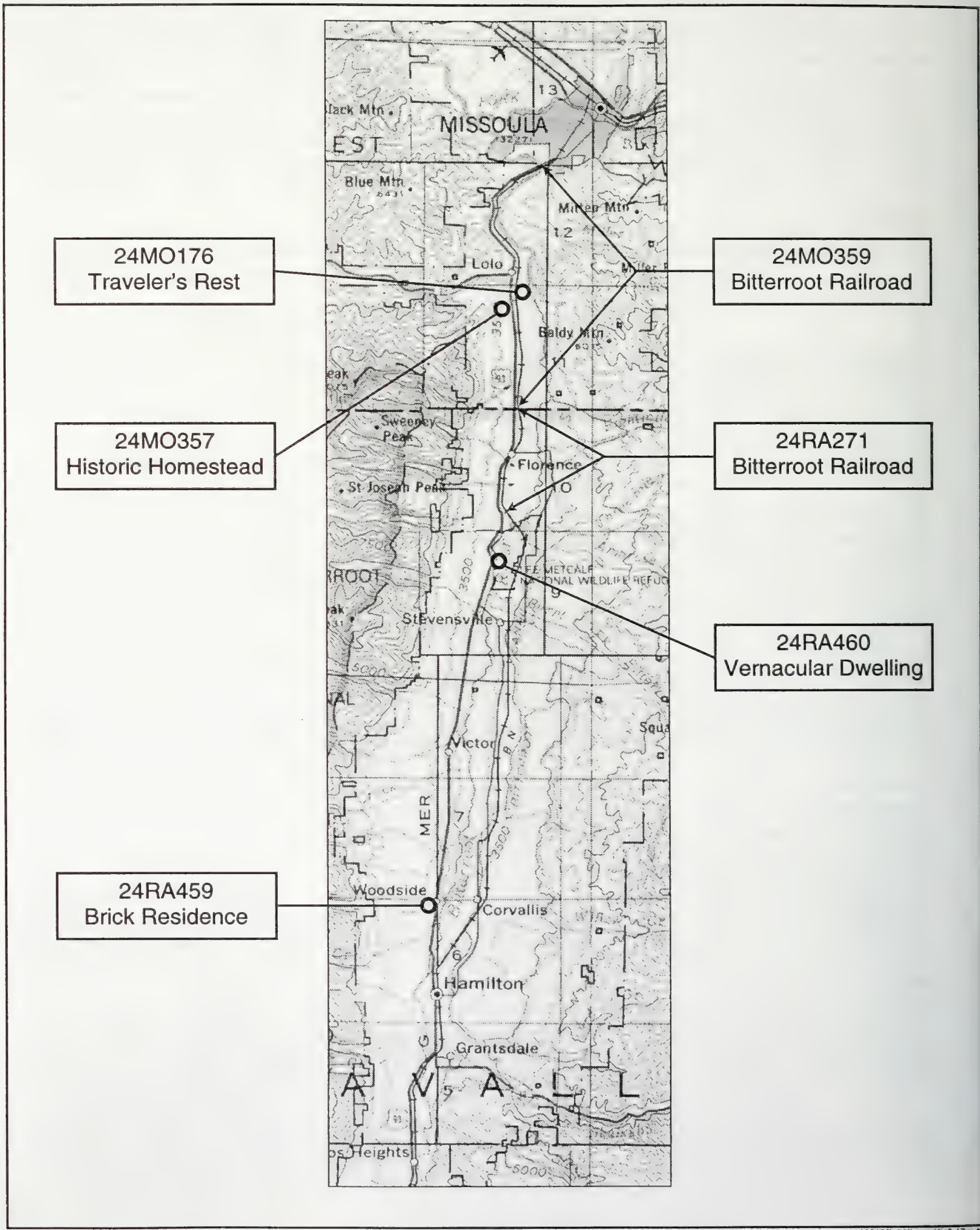
Milepost Location	Site #	Description	Eligibility		Remarks
			Criterion	Not	
49.4	24RA462	Bridge		X	
51.8	24RA459	Lumber Yard		X	Site as a whole not eligible, but Brick residence eligible under Criterion C
52.2	24RA458	Farmstead		X	
52.3	24RA465	Farmsite/Office		X	
57.7	24RA466	Farmstead		X	
64.5	24RA464	Residence		X	
68.7	24RA460	Farmstead		X	Site as a whole not eligible, but Wood dwelling eligible under Criterion C
73.0	24RA467	Residence		X	
73.0	24RA468	Store		X	
71.8-76.9	24RA271	Bitterroot Railroad	A		
76.9-82.1	24MO359	Bitterroot Railroad	A		
76.9	24MO358	Farmstead		X	
76.9	24MO356	Farmstead		X	
81.9	24MO357	Homestead	A		2 buildings also eligible under Criterion C
82.8	24MO176	Travelers Rest	A,B		Already registered as National Historic Landmark

3.19 CULTURAL RESOURCES

The Study cited above[23] also looked at cultural resources in the project corridor. For the purposes of presentation in this document, cultural resources are those either coming into existence prior to modern history in the area (before 1800) or that are associated with the continuance of unique cultural groups such as Native Americans.

The study of cultural resources was initiated by early coordination with tribal groups known to have past or present interest in the Bitterroot area. Existing records were searched for an indication of cultural resources. The final effort was a field investigation, walking serpentine transects for 150 meters (500 ft) on either side of the road. The cultural and prehistoric resources were recorded in detail in the field and photographed. The completed prehistoric forms were then provided for Native American review and information regarding the presence of potential historic resources was provided to the project historian.

FIGURE 3-17
PROPERTIES ELIGIBLE FOR
NATIONAL REGISTER OF HISTORIC PLACES



For the purpose of preserving and protecting these cultural resources, specific information of locations will not be given in this document but can be obtained through MDT or the State Historic Preservation office. Consultation with tribal groups on these resources is continuing, currently being led by MDT's Environmental Bureau.

Cultural Background: The project area represents a crossroads for cultures using different economic strategies. From the south and west came Great Basin and Plateau populations; both employing a diversified foraging strategy. The same is true of the plateau populations to the west. To the north and east were populations of hunters and gathers involved in exploitation of large herd animals.

The prehistory in this area consists of a sequence of hunting and gathering adaptations and has generally been divided into five major periods and a number of different sub units. Very little evidence of early period (13,000 to 5,500 BC) occupation exists in the Bitterroot Valley. During the middle prehistoric period (5,500 BC to 400 AD) some concentrations of groups in protected and humid locations such as the Bitterroot Valley occurred. Projectile points found in the area suggest activity in the area was on the increase toward the middle and latter portions of the middle prehistoric period.

During the late prehistoric period (500 to 1700 AD) generalized hunting and gathering strategies continued within the Bitterroot Valley. The greatest cultural difference was the adoption of the bow and arrow. Point styles provide evidence of occupations from persons associated with populations to the east, west, and south. Lastly, the proto historic period (1700 to 1800 AD) was a time rich in trading and traveling.

Evidence of the late prehistoric and proto historic occupations include numerous trails that exist within the Bitterroot Valley. Indeed the Bitterroot Valley has long served as a major travel corridor offering passage between east, west, north and south for those traveling in search of food and trade. Wide trails criss-cross the Valley permitting passage south through Lost Trail or Horse Creek Passes, east through Skalkaho or Gibbons Passes, west through Lolo or Nez Perce Passes, and north through Hell Gate Canyon.

These trails and passes through the Bitterroot were used by the Nez Perce, Shoshoni, Pend'Orielle, Salish Flathead, Kootenai, and Blackfeet Native American groups during the 18th and 19th centuries. As noted earlier in the historical section, the trails were naturally used by explorers, fur trappers, traders, and settlers as the area grew. Even US 93 is likely a descendent of trails established by these prehistoric area occupants.

Archaeological evidence shows Native Americans have inhabited Montana for more than 14,000 years. Oral tradition indicates the Salish Flathead had not been long-time residents of the Bitterroot Valley when the Euro-Americans arrived. Exactly when the Salish Flatheads located in the Bitterroot Valley is uncertain, but they were well established south of the mouth of Lolo Creek by the early 19th century. Their main encampment was located in a sheltered area near the present site of Stevensville. Government orders in 1855 and again in 1871 basically forced the Native Americans to move out of the Bitterroot area in major migrations and take up residence on a reservation in the Jocko Valley area of Northwest Montana. Notwithstanding the forced migration of these people, the Bitterroot Valley, including the project corridor, still has sacred significance to these tribal groups including a wealth of cultural resources.

Cultural Finds: A total of 11 rock cairns located in six distinct inventory sites were found suggesting the possibility of cultural resources. In general in the cairns measure 1.5 to 3.0 meters (5-10 ft) in diameter and consists of water-worn cobbles of quartzite and granitic rock. In some cases, the stones have been placed in concentric circles, in others they are merely placed within a circular area.

Generally speaking the cairn sites are associated with ridges or bluffs that give their location prominence to the surrounding area and are in fairly close proximity to surface water areas.

The sites must demonstrate the potential to be placed within a meaningful temporal context and further investigation of them is required to achieve this. Such investigation may likely be controlled excavation if

such is permitted or desirable from the viewpoint of the Tribal Cultural Committees. Information on the sites has been given to the tribes and further consultation is occurring through MDT Environmental Services.

3.20 RECREATION

The striking beauty and geography of the Bitterroot area created by mountain ranges east and west of a long narrow river valley also provides abundant opportunities for recreational activities. The mountains, streams, lakes, and rivers provide chances for camping, hiking, fishing, boating, hunting, nature watching, and other outdoor recreation activities. National Forests have been established in the mountainous areas on each side of the Valley that provide not only ample opportunity for these activities, but also improved access and actual facilities (campgrounds, trails, boat ramps, etc.) to encourage their use.

"Urban" centers in the project corridor provide other cultural and human-related recreational opportunities. These include parks, playgrounds, ballfields, community centers, theaters, and commercial recreation centers such as arcades and game rooms.

General Recreation in Study Corridor: Recreational opportunities in the study corridor are primarily oriented around outdoor water related activities and recreational facilities associated with developed areas. There are numerous private accesses to the river, old meanders, creeks, and private ponds providing opportunities for hiking, boating, and fishing. There is also public access to these opportunities as described in the next section.

City parks are found in the communities of Hamilton, Corvallis, Florence, and Lolo. The parks consist of grassy and shaded areas, picnic facilities, tot-lot playgrounds, and in some cases ballfields.

Recreational facilities are also associated with school buildings in Hamilton, Corvallis, Victor, Florence, and Lolo. These include playgrounds, football and baseball fields, basketball courts, track and field areas, and general open space. Most of the activities there are associated with school functions. However, the facilities also serve to support organized community recreational programs during off-hours and the summer months.

Specific Recreation Sites: Recreational facilities and opportunities within the study corridor and reasonably proximate to the highway are listed in Table 3-25. They are presented in groups by function and then in order of location in the corridor as one proceeds south to north.

TABLE 3-25
RECREATIONAL SITES IN STUDY CORRIDOR

Milepost	Highway Side Left or Right	Remarks
FISHING / BOATING ACCESSES		
49.5	LT	Silver Bridge - wide shoulders and graveled areas adjacent to highway, boating access on northwest side
50.5 - 50.7	RT	Blodgett Park - boating/fishing access to Bitterroot River, boat ramp provided
52.0	RT	Woodside Cutoff - access to pullout for boating and fishing access at Bitterroot River crossing 0.5 km (0.3 mi) east of US 93
54.0	RT	Sheafman Creek Road - access to ponded old river meander, 0.3 km (0.2 mi) east of US 93
54.6	RT	Fred Burr Creek - wide spot on road for parking and fishing access to Fred Burr Creek
56.0	RT	Tucker Crossing - access to boat ramp and fishing on Bitterroot River maintained by MFWP (Tucker Crossing) 0.2 km (0.1 mi) east of US 93
61.1	RT	Bell Crossing - access to fishing and boating at Bitterroot River crossing maintained by MFWP (Willoughby) 0.8 km (0.5 mi) east of US 93
66.7	RT	Eastside Highway (to Stevensville) - access to fishing and boating access at Bitterroot River 0.3 km (0.2 mi) east of US 93

66.8 - 68.0	RT	Stevensville River Road - parallel road east of highway that runs along west bank of river, providing fishing access (0.3 km [0.2 mi]) east of US 93
70.0	RT	Bass Creek Fishing Access - turnout and parking area adjacent to US 93 maintained by MFWP (Bass Creek) along highway providing access to Bass Creek, Bitterroot River, Slough area, and old railroad grade trail
70.6	RT	turnout and parking area adjacent providing access to Bitterroot River and trail along old railroad grade
71.5	RT	Poker Joe - access to fishing access at Bitterroot River maintained by MFWP (Poker Joe) 0.5 km (0.3 mi) east of US 93
74.7	RT	Eastside Highway - access to fishing and boating on Bitterroot River 0.8 km (0.5 mi) east of US 93
82.2	RT	wide shoulders and graveled areas along highway for fishing access
TRAIL HEAD ACCESSES		
49.8	LT	Intersecting road (Bowman Road) providing access to Blodgett Creek Trailhead 7.1 km (4.4 mi) west of US 93
52.0	LT	Intersecting road (Dutch Hill Road) providing access to Mill Creek Trailhead 5.8 km (3.6 mi) west of US 93
56.0	LT	Intersecting road (Bear Creek Road) providing access to Bear Creek Trailhead 8.5 km (5.3 mi) west of US 93
61.1	LT	Intersecting road (Big Creek Road) providing access to Big Creek Trailhead 6.1 km (3.8 mi) west of US 93
63.1	LT	Intersecting road (Indian Prairie Loop) providing access to St. Mary Peak Trailhead 12.8 km (8.0 mi) west of US 93
69.4	LT	Intersecting road (North Kootenai Road) providing access to Kootenai Creek Trailhead 3.8 km (2.4 mi) west of US 93
70.4	LT	Intersecting road (Bass Creek Road) providing access to Charles Waters Recreational Area 3.4 km (2.1 mi) west of US 93
PARKS / PICNIC AREAS / PLAYING FIELDS		
50.5 - 50.7	RT	Blodgett Park - boating/fishing access, picnic areas, shade and grassy areas, adjacent to US 93 on east side
59.2	LT	Victor City Park - picnic and grassy play areas, 1 block west of US 93
83.2	LT	Lolo Community Baseball Field - single diamond adjacent to US 93 on west side
WILDLIFE REFUGES		
68.8	RT	Otto Teller Wildlife Refuge - public wildlife refuge east of Bitterroot River. Accesses off of Eastside Highway (no access to US 93). 0.8 km (0.5 mi) east of US 93 at closest point. Refuge provides sanctuary and habitat for wildlife and waterfowl in wetland and upland areas. Viewing areas available
69.8	RT	Lee Metcalf National Wildlife Refuge - public wildlife refuge east of Bitterroot River. Accesses off of Eastside Highway (no access to US 93). 0.2 km (0.1 mi) east of US 93 at closest point. Refuge provides sanctuary and habitat for wildlife and waterfowl in wetland and upland areas. Viewing areas available. 232 bird species (102 nesting) and abundant wildlife recorded on 1129 hectare (2800 acre) preserve. Approximately 75,000 visitors annually.
INTERPRETATIVE SIGN PULLOUTS		
68.7	RT	Fort Owens/Stevensville interpretive sign - turnout area on US east side of US 93
69.0	LT	Fort Owens/Stevensville interpretive sign - turnout area on US west side of US 93
82.2	RT	Travelers Rest's historic sign - graveled pullout area on east side of highway

MISCELLANEOUS		
53.8	LT	Bitterroot Driving Range - privately owned golf practice facility adjacent to US 93 on west side
75.3 - 77.9	LT	Dirt Trail - pedestrian trail used by school children, horse riders, bicyclists, and motorcyclists along west side of US 93; established by use of existing vacant right-of-way by local residents
78.8	LT	Race Track - private facility for racing 0.3 km (0.2 mi) west of US 93
79.0 - 79.4	LT	Gravel Pit - supports motocross course for bicyclists and motorcyclists 0.3 km (0.2 mi) west of US 93
83.1	LT	Lolo Library - public library adjacent to US 93 on west side

3.21 REFERENCES

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CHAPTER 4.0

ENVIRONMENTAL CONSEQUENCES

ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This Chapter sets forth the direct, indirect, and cumulative environmental effects anticipated to occur as a result of implementing the alternatives described in Section 2.5, including the preferred alternative. Where appropriate, mitigation measures to reduce or eliminate environmental impacts are also discussed. Impacts are identified by referencing the background environmental information presented previously in Chapter 3.0 - "Affected Environment".

Information in this Chapter is presented in five major categories for ease of cross-referencing to the background conditions listed in Chapter 3.0 - "Affected Environment".

A. Physical Environment
B. Biological Environment
C. Human Environment
D. Miscellaneous Considerations
E. Summary of Impacts and Mitigation

Information presented in this Chapter comes primarily from the background studies conducted to investigate and predict potential environmental impacts associated with each of the categories discussed. Other information reflects current literature, nationwide codes and standards, or information received from the public through the public involvement process that helped identify potential impacts.

Sometimes implementation of an action creates additional impacts beyond those that are considered to be a direct result of the action. Such additional impacts are known as "indirect," "secondary," and "cumulative" impacts. Indirect or secondary impacts are those that are caused by the action but appear later in time or farther removed in distance. Cumulative impacts are those which result from the incremental impact of a proposed action added to other past, present, or future actions.

Often it is difficult to clearly differentiate between indirect, secondary, and cumulative impacts. In the evaluation sections presented in this chapter, these impacts have been lumped together for consideration of total impacts and to present a more thorough picture of the future situation.

Discussion is also given on mitigation measures that can be employed to reduce or eliminate the impacts identified. Mitigation measures were identified and recommended in many of the studies and have also been drawn from measures previously identified or successfully used for similar projects.

Lastly, Section E provides tables affording quick and easy general comparison of the alternatives among the principal categories of possible impacts. It also provides a summary of recommended mitigation measures that will help guide designers and administrators toward developing the least damaging and most cost effective solutions to transportation problems in this corridor.

Tables summarizing environmental impacts with regard to each of the alternatives and also reviewing the alternatives' capabilities of meeting the stated purposes and needs are presented at the end of Chapter 2 in Table 2-11 and Table 2-12, respectively. Review of these tables provides a quick way to compare the alternatives against each other for their ability to meet the purposes and needs for the project and for the impacts they are expected to produce.

A. PHYSICAL ENVIRONMENT

4.2 WATER RESOURCES

Existing conditions relating to water resources in the project corridor were discussed in Section 3.2. Referencing the same Water Quality Report,[1] following is a discussion of anticipated impacts. The discussion has been organized into the two major categories of surface water and groundwater to facilitate discussion. Irrigation impacts are in the Surface Water Section. However, floodplain impacts are discussed separately in Section 4.3 in order to provide more detail. Likewise, impacts to wetlands will be discussed separately in Section 4.9.

Requirements of the Safe Drinking Water Act and the Clean Water Act must be satisfied by any proposed actions. Basically, these regulations provide for non-degradation of water resources and quality. The mechanism to track this is by issuance of permits for proposed activities; particularly any associated with construction. Required permits associated with water resource and quality issues are discussed in Section 4.24 along with other permits required.

♦ SURFACE WATER

Common Impacts: Regardless of the implementation of any alternative, including "no action", growth in the Valley in general and this corridor in particular is expected to continue. While impacts associated with land use and growth are discussed elsewhere in this Chapter, it is important to note that traffic will continue to increase which will cause greater non-point pollution resulting from oils, greases, vehicle and pavement wear, combustion productions, and road salts or chemicals from maintenance operations. Similarly, growth of the area can affect surface water quality by lowering infiltration (producing more runoff) and increasing the erosion and runoff from development areas.

Two other potential sources of impacts are spills related to accidents or construction, and sediment loading during and after construction due to disturbance of surface vegetation. Additionally, construction impacts are anticipated associated with placing fill materials in or near streams.

Impacts to surface water and water quality associated any alternative are expected to be minimal. A Federal Highway Administration (FHWA) research program concluded that highway facilities with average daily traffic levels less than 30,000 vehicles per day have been found to have minimal impacts to receiving waters. This has been confirmed by the Montana Water Quality Division. When traffic volumes are below this threshold amount, adjacent soils and vegetation play an active role in filtering and diminishing pollutant levels during runoff. Secondly, annual pollutant loadings from highways are an extremely minute percentage of the total pollutant loads from the entire watershed.

Construction of alternatives has the potential to create water quality impacts. However, past construction projects have demonstrated ways to reduce or eliminate water quality concerns during construction. From experience, best management practices (see mitigation section) have been developed to keep construction activities from having a major impact on surface water and water quality.

Local governments have a degree of control over development through land use policies and permitting processes; particularly with regard to wastewater disposal needs. Comprehensive plans have been developed to help guide land use and development patterns in an effort to minimize environmental impacts; including those to surface waters and water quality.

Irrigation facilities (2 small canals and about 23 ditches) are likely to be temporarily disrupted by any alternatives requiring construction. Sound engineering design usually eliminates any long-term impacts and short-term disruptions can be mitigated by proper timing of construction activities.

"No build" alternatives will be more susceptible to chemical and hazardous materials spills since the accident potential is higher for a narrower, more congested facility and expected increases in the proportion of commercial truck traffic from a growing economy and NAFTA. They also allow continued use of treated timbers for bridge crossings which introduces very small quantities of hazardous materials into the stream flow.

Since the "build" alternatives offer the opportunity to reduce congestion and improve traffic flow, they reduce the potential for accidents and spillage that might otherwise negatively impact surface waters.

Specific Impacts: The "no action" alternative will see continued non-point pollution potential from the existing and increasing traffic using the corridor.

Park-and-ride facilities will reduce traffic (and associated non-point pollution), but will in turn create construction impacts and larger impervious surfaces generating more runoff with its associated pollutant load. Proper attention to construction practices and storm water management will reduce these impacts to a negligible level.

The commuter bus system will reduce traffic volumes and associated non-point pollution load. However, the buses themselves are a source of contaminants.

Implementation of a passenger rail system will require extensive construction activities along the rail line in addition to providing major stations and parking areas along the way. Impacts associated with construction are considered to be similar to those discussed in the common impacts section.

All "build" alternatives for highway improvements will have impacts associated with placement of fills in stream areas, runoff from impervious pavement, and impacts associated with construction providing the potential for turbidity and sedimentation increases. Those alternatives requiring greater surface area (e.g., 5-lane alternative) will have proportionately greater impact than those alternatives disturbing less area.

Minimal changes in flow quantities and velocities will result. Similarly, sedimentation and turbidity are not anticipated to be problems as long as best management practices are utilized during construction. A study[2] conducted on a portion of US Highway 93 north of this project corridor concluded that sediment loads associated with possible construction alternatives amounted to only about 3% of the natural springtime sediment load being carried in nearby water courses. This assumption was made being liberal with the amount of rainfall and amount of sediment transport over vegetative areas. Accordingly, sedimentation and turbidity problems are considered to be insignificant.

The Silver Bridge realignment alternative would have greater impacts than following the existing alignment since it requires crossing the Bitterroot River floodplain on a new alignment. This increases the potential for increasing turbidity and sedimentation, particularly during construction.

The Bass Creek Hill realignment is considered beneficial as it would move highway facilities further away from the Bitterroot River, reducing the potential for water quality and surface water impacts.

Impacts to surface waters and water quality for the preferred alternative are anticipated to be the same as those discussed above for "build" alternatives and the park-and-ride system.

Indirect Secondary, or Cumulative Impacts: Since the individual impacts to surface water and water quality are considered to be negligible, the proposed improvements are not expected to produce any adverse indirect or cumulative impacts on the quality of surface waters in the Bitterroot Valley or region.

Mitigation: Several good mitigation measures have already been developed, refined, and tested to minimize impacts associated with construction activities on surface waters and water quality. Potential mitigation concepts include:

- Development and design of an erosion control work plan based on best management practices and approved by the Montana Water Quality Division.

  Goals of the erosion control plan will be to:
  - design the development to fit the project setting
  - minimize the extent of disturbed area and duration of exposure
  - stabilize and protect disturbed areas as soon as possible
  - keep runoff velocities low
  - protect disturbed areas from runoff
  - retain sediment within the corridor
  - implement a thorough maintenance and follow-up program

  Best management practices will include:
  - slope roughening
  - temporary and early seeding
  - mulching
  - erosion control blankets
  - straw blankets
  - gravel filter berms
  - ditches and settling basins
  - pumping dewatering operations to settling basins
  - silt fences
  - streambank protection

- Use fill materials that are chemically stable, composed of common, naturally-occurring aggregates or materials found in the Bitterroot Valley.

- Develop construction practices, safety plans, and contingency procedures to prevent spills of hazardous materials during construction and contain them if they do occur.

- Design structures (culverts and bridges) to not obstruct or change flow characteristics in creeks and rivers.

- Provide gentle sideslopes to roadway for snow retainage, filtration, and gradual release of runoff.

- Minimize the extent of areas disturbed during construction and the duration of such exposure prior to revegetation.

- Design storm water collection and conveyance systems in "urban" areas to be properly managed.

- Restrict construction vehicle operations on unpaved areas.

♦ GROUNDWATER

Protection of groundwater is also important. Currently, the State of Montana has a non-degradation of groundwater policy that requires special efforts to be made to prevent adverse impacts or introduction of any pollutants to the groundwater. Three other regulatory actions have been established to assist in the effort to protect groundwater resources.

The first is the Sole Source Aquifer program established by the Environmental Protection Agency (EPA). This program recognizes those aquifers that are the only source of culinary supplies for a given area and imposes specific restrictions to see that the source is protected. There is a sole source aquifer under the Missoula area that has been designated for protection under this program. However, its boundaries are immediately south of the Missoula area; therefore it is well beyond the project corridor of this study.

The Wellhead Protection program imposes regulations controlling the activities and development around currently existing wells to assure the sources immediately beneath are not adversely affected. A wellhead protection program was approved for the project corridor area by the EPA in the fall of 1994. However, the program is to be locally administered and has not yet been certified as it is still in the stages of being established from an administrative point of view. Although there are numerous private wells on properties adjacent to the highway corridor, none are known to be close enough to the highway to be endangered by any proposed activities or to create compliance problems with the Wellhead Protection Act.

The last regulatory mechanism for protection of groundwater sources are regulations associated with public water and wastewater systems. Such systems are known to exist in the "urban" areas within the project corridor, but impacts associated with any proposed improvements would merely call for adjusting surface accesses to these systems (manhole rings, water valve covers, etc.) which is a routine function that will not produce any effect on the systems or their operation.

Common Impacts: The groundwater recharge areas for this corridor are the Bitterroot Mountains west of the Valley floor. Therefore, no adverse impacts on groundwater recharge are foreseen for any of the alternatives.

Groundwater monitoring wells have been installed in various locations in the corridor to help understand the extent of groundwater resources and quality, monitor groundwater movements, and provide other similar information useful in minimizing adverse impacts and helping to improve possible designs. Presently, none of the groundwater monitoring data suggests any adverse impacts will occur with respect to route location or geometry.

The "no action" and "no build" alternatives have a slightly higher potential to adversely affect groundwater resources from the increased potential for spills from accidents related to the congestion of the existing facility.

Specific Impacts: Construction of any "build" alternatives, including the preferred alternative and the alignment alternatives, all have the opportunity for potential groundwater impacts during construction. The chance to produce groundwater impacts is directly proportional to the extent of construction activities. It is anticipated that groundwater levels will be near the following levels at various locations along the corridor.

Milepost Location	Depth to Groundwater	
	meters	feet
49.2 to 49.5	1.5 - 1.8	5.0 - 6.0
49.5 to 49.9	0.6 - 0.9	2.0 - 3.0
49.9 to 56.4	1.5 - 1.8	5.0 - 6.0
56.4 to 59.3	2.4 - 3.7	8.0 - 12.0
59.3 to 63.0	3.7 - 7.6	12.0 - 25.0
63.0 to 66.7	0.6 - 1.8	2.0 - 6.0
66.7 to 72.4	2.4 - 3.1	8.0 - 10.0
72.4 to 73.8	0.6 - 1.8	2.0 - 6.0
73.8 to 77.9	2.4 - 3.1	8.0 - 10.0
77.9 to 80.5	0.9 - 1.5	3.0 - 5.0
80.5 to 82.3	1.8 - 2.4	6.0 - 8.0

Other areas of potential impact are cut-sections (excavated areas for roadway) that may be constructed below perched groundwaters; thus creating a natural outlet for groundwater movement. These and other situations may require special design or construction procedures as discussed in the Mitigation Section hereafter.

Construction spills and encounters with buried hazardous materials during construction could result in percolation of pollutants into groundwater sources. Again, proper prevention plans, emergency response plans, and mitigation procedures will reduce these potentials to minimal levels.

Overall, potential impacts to groundwater sources and quality associated with any of the proposed actions will be minimal.

Indirect, Secondary or Cumulative Impacts: Since potential impacts associated with proposed actions are considered to be minimal, none of the actions are expected to cause or contribute to cumulative adverse impacts on groundwater quantity or quality in the region.

Mitigation: The following are mitigation procedures to help reduce or eliminate potential impacts on groundwater resources:

- Use chemically stable fill materials that match the characteristics of naturally occurring aggregates and materials in the project area.

- Develop a spill prevention plan and emergency response plan to take care of spills or encounters of hazardous materials during construction or operation of the highway.

- Pump any water out of excavations into stilling basins where it can be settled and tested for water quality prior to reintroduction into the groundwater.

- Design to prevent the disturbance of shallow groundwater flow patterns and quality wherever possible. For example, irrigation canals, ditches, and agricultural drainage systems should be maintained in their existing location and condition to the extent practicable.

- Provide for continuation of surface flow patterns through the corridor and avoid creation of new impoundment areas where percolation may introduce additional pollutants or alter groundwater hydrology.

- Implement the best management practices discussed under the surface waters section to control erosion water runoff and potential percolation of contaminants into groundwater resources.

4.3 FLOODPLAINS

Floodplain regulations and existing floodplain conditions were previously discussed as a part of Section 3.3. A Floodplain Study[3] was conducted to identify probable impacts associated with the alternatives. The 404(b)(1) evaluation in Appendix C presents additional data on floodplains such as existing and potential structure type (bridge or culvert), fill volumes, etc., for each of the alternatives.

Common Impacts: Most of the floodplain areas having a potential to be impacted are already being encroached upon by the existing highway. The "no action" and "no build" alternatives would have only the impacts presently existing, but would not create additional impacts. A possible exception might be the rail alternative, which if line and grade are changed at all to accommodate passenger service could result in some additional encroachment.

Specific Impacts: Table 4-1 summarizes the additional 100-year floodplain impacts associated with constructing the "build" alternatives. The results shown in the table follow the proposed realignment in the Silver Bridge and Bass Creek Hill areas. The entries in the table at these two locations (milepost 49.5 to 51.0 and 65.1 to 65.9) would show a decrease of 0.8 to 1.0 hectares (2.0 to 2.5 acres) for Silver Bridge and an increase of 2.6 to 4.0 hectares (6.5 to 9.9 acres) for Bass Creek Hill.

TABLE 4-1
FLOODPLAIN IMPACTS

Milepost		Drainage Name	Modified 2-Lane		4-Lane Undivided		4-Lane Divided		5-Lane		Preferred Alternative	
From	To		hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres
49.5	51.0	Bitterroot River	5.88	14.53	6.83	16.88	8.37	20.68	7.53	18.61	7.30	18.04
51.5	51.7	F Burr Creek	1.14	2.82	1.25	3.09	1.73	4.27	1.36	3.36	1.36	3.36
55.0	55.1	Big Creek	0.00	0.00	0.01	0.02	0.02	0.05	0.04	0.02	0.01	0.02
61.5	61.6	Big Creek	1.04	2.57	1.12	2.77	1.44	3.56	1.22	3.01	1.17	2.89
63.4	63.4	Bitterroot River	0.00	0.00	0.00	0.01	0.02	0.05	0.02	0.05	0.00	0.01
63.8	65.1	Bitterroot River	6.53	16.14	6.99	17.27	9.71	23.99	7.96	17.67	7.09	17.52
65.1	65.9	Bitterroot River	0.00	0.00	0.05	0.12	0.08	0.20	0.11	0.27	0.11	0.27
65.9	66.2	Bitterroot River	2.04	5.04	2.25	5.56	3.04	7.51	2.48	6.13	2.48	6.13
69.2	69.7	Bitterroot River	0.82	2.03	0.90	2.22	1.04	2.57	0.95	2.35	0.90	2.22
70.4	71.1	Bass Creek	0.62	1.53	0.72	1.78	0.77	1.90	0.83	2.05	0.73	1.80
76.6	76.9	County Line	0.08	0.00	0.10	0.25	0.12	0.30	0.22	0.54	0.13	0.32
82.9	83.0	Lolo Creek	0.28	0.69	0.28	0.69	0.41	1.01	0.30	0.74	0.30	0.74
		TOTAL AREA	18.43	45.35	20.50	50.66	26.75	66.09	23.02	54.80	21.58	53.32

The "no action" alternative would maintain existing floodplain encroachments. The park-and-ride, commuter bus service, and passenger rail service would have facilities likely constructed near metropolitan areas (away from floodplains) resulting in minimal impacts.

As the table indicates, the 4-Lane Divided highway would encroach on the most floodplains due to its wider section and wider fills required when crossing floodplain areas. Each of the other "build" alternatives are somewhat less in direct proportion to the surface width of the facility.

Preliminary hydraulic analyses have been conducted for each proposed floodplain encroachment. The analyses follow current Montana Department of Transportation (MDT) standard procedures in accordance with the Federal Highway's Program Manual Section 6-7-3-2, which require floodplain encroachment investigation for the following items:

- alignment of flow into drainage structures
- increased backwater upstream of drainage structures
- increases in velocity in the proposed opening or channel area
- effect on channel stability upstream and downstream of crossings
- increased risks to property and transportation facilities
- verification of the delineated floodplain and any future delineated regulatory floodway

In general terms, the study must insure the proposed encroachment does not create an increase of more than 0.3 m (1.0 ft) in the flood elevation. If so, then the following options would be available:

- increase structure opening or shift alignment out of the floodplain
- redelineate FIRM map boundaries if they are found to be inaccurate
- purchase property and relocate buildings as necessary
- reimburse property owners for flood-proofing
- obtain a permanent easement for flooding of unimproved properties

The preliminary hydraulic analyses show none of the proposed encroachments on floodplains are anticipated to result in any increased risk or potential losses for property owners.

The only major new floodplain encroachment for the proposed action would be at the Bitterroot River crossing just north of Hamilton. This would occur if the bridge is realigned as presently recommended in the preferred alternative. Realignment is recommended in this area to eliminate substandard curvature in the highway, to improve river hydraulics and stability at the crossing location, and to provide for a continuation of traffic during construction.

The Bitterroot River floodplain in this general area varies from 495 to 770 meters (1600 to 2500 ft) in width. Spanning the entire area would not be cost effective. However, some encroachment on the floodplain, if carefully studied and designed, could be done without adverse impacts to the floodplain. An additional benefit would be the removal of the approach embankments on the existing Silver Bridge which would eliminate a serious encroachment already known to be causing trouble with the floodplain, including changing river velocities and producing associated cutting and filling of the stream bottom. Permits and licenses (see Section 4.24) will be required for a new crossing at this location.

Overall, impacts to floodplains can be eliminated or reduced by proper attention to design and mitigation measures.

Indirect, Secondary or Cumulative Impacts: The increase in floodplain encroachment areas is quite minimal compared to the large areas of floodplains that exist. Proper attention to avoidance where possible, proper hydraulic design, and mitigation to minimize encroachments will keep the individual impacts to a negligible level; therefore no adverse indirect or cumulative impacts are anticipated.

Mitigation: Mitigation measures to eliminate, reduce, or accommodate floodplain encroachments are as follows:

- Design for adequate structure or culvert size at each crossing to keep impacts to a minimum.
- Coordinate closely with the County Floodplain Administrator to review potential impacts and obtain design guidance and recommendations for minimization.
- Design to keep proposed profile grade for any "build" alternatives that are above the existing present traveled way to a minimum in floodplain areas to reduce the need for additional fill encroachments on floodplains.
- Consider using bridges in place of culverts where possible to reduce encroachments on floodplains.
- Consider lengthening approach guardrail (where used) and steepening adjacent sideslopes to minimize impact on floodplain areas.

4.4 AIR QUALITY

A discussion of current regulations and air quality conditions was previously presented in Section 3.4. An Air Quality Study[4] was conducted to qualitatively analyze emissions of carbon-monoxide (CO) and particulates (PM_{10}), which are air pollutants associated with transportation projects in the study corridor and are those most likely to produce an impact. Concentrations of air pollutants for PM_{10} were predicted by the paved road dust emission equation in EPA's publication of *"Compilation of Air Pollution Emission Factors (AP-42)"*.

Common Impacts: Particulate matter includes small particles of fugitive dust, tiny droplets of liquids, and organic matter suspended in the atmosphere. Particles less than ten micrometers in size are measured and reported as PM_{10}. The smaller PM_{10} particles can be inhaled deeply into the lungs, leading to respiratory diseases and cancer. Particulate matter may also be toxic or contain toxic substances. Particulate matter can affect visibility, plant growth, and building materials. Sources of particulates include motor vehicles, industrial boilers, wood stoves, open burning, and dust from roads, agricultural, and construction activities.

High PM_{10} concentrations occur in the fall and winter during periods of air stagnation and high use of wood for heating, and again in the spring when sanding material is suspended in the atmosphere as dust after the final snow melt.

PM_{10} concentrations were predicted by equation for the worst case situation. Assumptions for this situation were having maximum expected silt load on the roadway surface (silty sand residue from snowplowing operations) and maximum expected average daily traffic. Since the traffic is projected to be the same regardless of alternative, the results show expected PM_{10} emissions of 929 kilograms/day at present and 1420 kilograms/day 20 years in the future for all alternatives.

CO is a colorless, odorless, and poisonous gas that reduces the oxygen carrying capability of blood by displacing oxygen in the hemoglobin. CO aggravates pre-existing cardiovascular diseases, increases the risk of heart disease in healthy individuals, and is associated with lower birth rates and increased mortality rates in newborns. The major source of CO is vehicular exhaust, along with industrial boilers, wood stoves, and open burning. High concentrations of CO usually are localized and occur near congested roadways and intersections during autumn and winter.

All alternatives will see impacts related to CO and PM_{10} associated with transportation projects in the area. Those alternatives incorporating construction will also see temporary and localized increases in PM_{10} concentrations.

Long-term impacts will result from CO and PM_{10} emissions from vehicles on roadways. Concentrations of CO at nearby locations would increase in proportion to increases in traffic volume and decreases in vehicle speeds. In general, the greatest CO concentrations would occur near congested areas of the roadway during temperature inversions in the winter. Emissions of PM_{10} are directly related to traffic volumes and the quantity of particulate matter on paved surfaces.

For all alternatives, future concentrations of CO and PM_{10} from vehicle exhaust would be below the National Ambient Air Quality Standards. This is due to low background concentrations in the project area's rural location, reduced congestion resulting from improvements, the project area's location outside CO and PM_{10} non-attainment areas, and stricter federal auto emissions standards that will reduce vehicle exhaust emissions over time.

PM_{10} emissions would increase in proportion to traffic volumes and the amount of particulate matter deposited on the roadway surface. Deposited particulate matter would become suspended in the atmosphere, which is known as re-entrained road dust. Sanding material to control snow and ice would accumulate on the roadway surface in communities where high levels of sanding materials were applied during the winter. High levels of PM_{10} would occur along US 93 in early spring between the last snow melt and the cleaning of the streets either by traffic on the open road or by street cleaning. Particulate matter could also be carried onto paved roads from unpaved shoulders and parking lots. With properly employed mitigation measures, emissions of PM_{10} from these sources are not expected to be significant.

Specific Impacts: CO and PM_{10} emissions are predominantly proportional to the volume of traffic. Since traffic volume is expected to increase in the corridor at an annual rate of about 4%, all alternatives (including "no action") will see an increase in traffic-related air quality emissions. In particular, impacts among the various "build" alternatives are expected to be similar since they will have the same traffic volume and generally the same operational characteristics in terms of traffic flow and distribution. . Impacts along the realignment alternatives at Silver Bridge and Bass Creek Hill would be considered the same as those on adjacent segments because the traffic volume will be the same.

Compared with existing conditions, projected traffic volumes in the design year would increase by an average of about 50% along US 93 in the Hamilton to Lolo corridor. The increase in traffic volumes would increase emissions of air pollutants. Any resulting increase in emissions from additional traffic should be offset by reduction in emissions from newer motor vehicles, as less efficient, older models are replaced over time by more efficient, newer models. Therefore, it is anticipated that future concentrations of CO in the project corridor would be less than under existing conditions.

The "no action" alternative will see the same volumes of projected traffic in the future as the other alternatives. Without additional lanes or substantial reductions in the amount of vehicles using the highway through transportation demand management practices, congestion would significantly increase leading to more stopping and idling, which result in the highest emissions of CO. Therefore, the "no action" alternative would have a greater impact on CO emissions than those alternatives which reduce traffic or reduce congestion.

PM_{10} emissions would be expected to be similar for all alternatives since PM_{10} emissions are related more to volume of traffic than operational conditions (i.e. stopping and starting).

Implementation of the park-and-ride, commuter bus, or passenger rail service would all result in some reduction in CO and PM_{10} emissions through the reduction of traffic they allow. Studies indicate this reduction would be 9% at theoretical best, but likely 3-4% in actuality.

"Build" alternatives will result in reduced CO emissions through a reduction of congestion and smoothing of traffic flow. However, they also bring with them the possibility for air quality impacts from construction activities, which if not properly mitigated, would temporarily generate additional PM_{10} and small amounts of CO. Land clearing/burning during clearing of the right-of-way, blasting, ground excavation, cut and fill operations, construction of roadway base and surface, and equipment traffic would all emit PM_{10}. Trucks leaving unpaved areas of the construction site would deposit mud on the highway, which would become a source of PM_{10} after it dries. Detours could increase traffic on unpaved roadways, thus resulting in greater temporary PM_{10} emissions. Heavy trucks and construction equipment powered by gasoline or diesel engines would generate additional small amounts of CO.

Since the project site is surrounded largely by undeveloped land, few sensitive receptors would be exposed to air pollutants during construction. At single-family residences and businesses adjacent to construction activities along the highway, local air pollutant concentrations temporarily would increase during construction. Emissions of PM_{10} and CO from construction that incorporates proposed mitigation measures would be considered to be minimal.

Some phases of construction, particularly during paving operations using asphalt, would result in short-term odors. Odors might be detectable to some people near the project, but would be diluted as distance from the roadway (or source) increases.

Construction impacts among the "build" (lane configuration) alternatives are expected to be similar. The realignment alternatives at Silver Bridge and Bass Creek Hill would require new areas of construction; thus possibly producing greater emissions than areas disturbed along the existing alignment of US 93.

Indirect, Secondary or Cumulative Impacts: Construction activities in the northern part of the project corridor might contribute additional PM_{10} emissions to the Missoula PM_{10} non-attainment area. Although the net increase in emissions likely would be quite temporary in duration and small in quantity compared with the total particulate emissions in this area, the additional incremental PM_{10} emissions might contribute to cumulative impacts when added to other particulate sources.

The area population is expected to continue increasing with or without the proposed action. Cumulative impacts from an increase in ambient concentrations of CO and PM_{10} may occur due to the corresponding increase in traffic volume added to the increased combustion of home heating fuels (particularly wood burning stoves).

Actions to reduce the amount of traffic on the highway by the "no build" alternatives and to reduce congestion afforded by "build" alternatives will reduce CO emissions in the Bitterroot, which may have a cumulative positive effect with auto industry efforts to reduce vehicle emissions.

Similarly, sanding material used in the northern part of the project corridor may contribute to cumulative impacts on the Missoula PM_{10} nonattainment area. With proper use of proposed mitigation measures, emissions of PM_{10} from sanding materials are not expected to be significant.

Lastly, the "no action" alternative may create cumulative impacts associated with the congestion it creates. During times of peak highway usage it will be difficult for vehicles to enter the main highway from side roads and streets in local communities. Traffic on the main highway may be subject to "stop and go" operation due to congestion. The resulting stoppage and idling time will create an increase in CO emissions.

Mitigation: Construction impacts on air quality can greatly be reduced by incorporating mitigation measures into construction specifications that require contractors to comply with Montana Department of Transportation and Montana Air Quality Division requirements. Mitigation measures to reduce PM_{10} and CO emissions during construction include:

- Spraying exposed soil and storage areas with water.
- Providing wheel washers to clean particulate matter from vehicles.
- Equipping construction equipment with appropriate emission controls.
- Sweeping public roads daily to remove particulate matter deposited by construction vehicles.
- Using paved roads wherever possible for detours, or watering or chemically stabilizing unpaved detour roadways.
- Burning slash piles in compliance with open burning restrictions (including obtaining a burning permit from the County).
- Assuring that portable rock crushing equipment and asphalt plants associated with "build" alternatives meet applicable emission limitations and have proper air quality permits from MAQD.

Since the NAAQS would likely not be exceeded under any proposed action, mitigation measures to reduce long-term CO emissions would not be necessary. Implementation of alternatives that would reduce congestion are in fact a mitigation measure to reduce CO emissions. Transportation demand management (TDM) alternatives to reduce traffic volumes or the number of vehicle miles traveled would also produce reductions in CO and PM_{10} emissions. Incorporating access control policies that will compliment local land use plans, especially efforts to control strip growth, will help reduce PM_{10} and CO emissions.

To reduce long-term emissions of PM_{10} from sanding materials applied during the winter, snow and ice could be controlled by using sand with a lower silt content or by using chemical or liquid deicers. Sand that has cumulated along the highway and adjacent streets during the winter should be promptly swept and cleaned off after melt of the last snow. Lastly, the first 3.0 meters (10 ft) of all accesses to the highway should be paved, which will significantly reduce particulate matter carried onto the highway by vehicles entering from unpaved roadways, parking lots, and approaches.

4.5 NOISE

Noise standards and background noise information is discussed in Section 3.5. A Noise Study[5] was conducted for the highway corridor to inventory existing noise levels and predict future noise associated with the proposed alternatives. Information that follows summarizes the impacts identified by that study.

Methodology: A description of the noise standards and technical terminology used to describe noise measurements was previously given in Section 3.5. For convenience, reference is made to that section rather than repeating the definitions here.

$L_{eq}(h)$ traffic noise levels were predicted using the Federal Highway Administration's STAMINA 2.0 computer model. Predicted noise emissions from free flowing traffic at constant speeds depend on the number of automobiles and trucks per hour, vehicular speed, and reference noise emission levels of an individual vehicle. STAMINA 2.0 also considers effects of intervening barriers, topography, trees, and atmospheric absorptions. Noises from sources other than traffic are not included in the analysis.

Predicted noise levels were based on present and future design hour volumes of traffic on US 93. The design hour volume is the 30th highest hourly volume of the year which normally works out to be 15% of the average daily traffic. Consistent with the reasoning set forth in the previous section on air quality, traffic volumes for the "no action" and "build" alternatives were assumed to be the same. Volumes in each direction were assumed to be 50% of the total volume. The vehicle mix assumed for all alternatives was 93% automobiles, 4% medium trucks, and 3% heavy trucks. This is a slightly higher truck percentage than was observed during the measurements of noise in the field, but is close to other traffic survey information obtained on this project.

To evaluate worse case conditions, speeds on the highway were assumed to be 90 km/h (55 mph), except 70 km/h (45 mph) through the community of Victor. Speeds on the Eastside Highway and all side roads were

assumed to be 70 km/h (45 mph) and on US 12 to be 90 km/h (55 mph). Traffic volumes were provided at various stations along the length of US 93 from the Traffic Study. Figure 4-1 illustrates the locations of the stations as well as the five critical receptor areas where ambient measurements were taken.

Peak hour L_{eq}(h) traffic noise levels (projected during evening rush hour) were predicted at the 13 stations and the five ambient measurement locations. Noise levels were predicted at distances of 30, 45, and 90 m (100, 150, and 300 ft) from the centerline of the roadway. The 30 m (100 ft) distance from centerline was analyzed as the nearest distance to the roadway to account for right-of-ways anticipated under the various "build" alternatives.

Modeling conditions assumed US 93 to be 2-lanes (each 12 ft wide) for existing conditions and the future "no action". For "build" alternatives the worse case situation of a 4-lane divided highway with a 40 ft median would be the widest and loudest of all lane configuration alternatives and represents the worst-case analysis for comparison of impacts among alternatives. For the purposes of modeling, widening was assumed to occur equally along both sides of the present highway. All other side roads in the corridor were assumed to be 2-lane roadways with 12 foot lanes. Terrain was assumed to be level and all sites acoustically soft. No shielding or barriers were included in predicting the noise levels shown hereafter.

Common Impacts: Environmental noise can directly affect human health by causing hearing loss and is suspected of causing or aggravating other diseases. It indirectly affects human welfare by interfering with sleep, thought, and conversation. Environmental noise also reduces property values and affects wildlife.

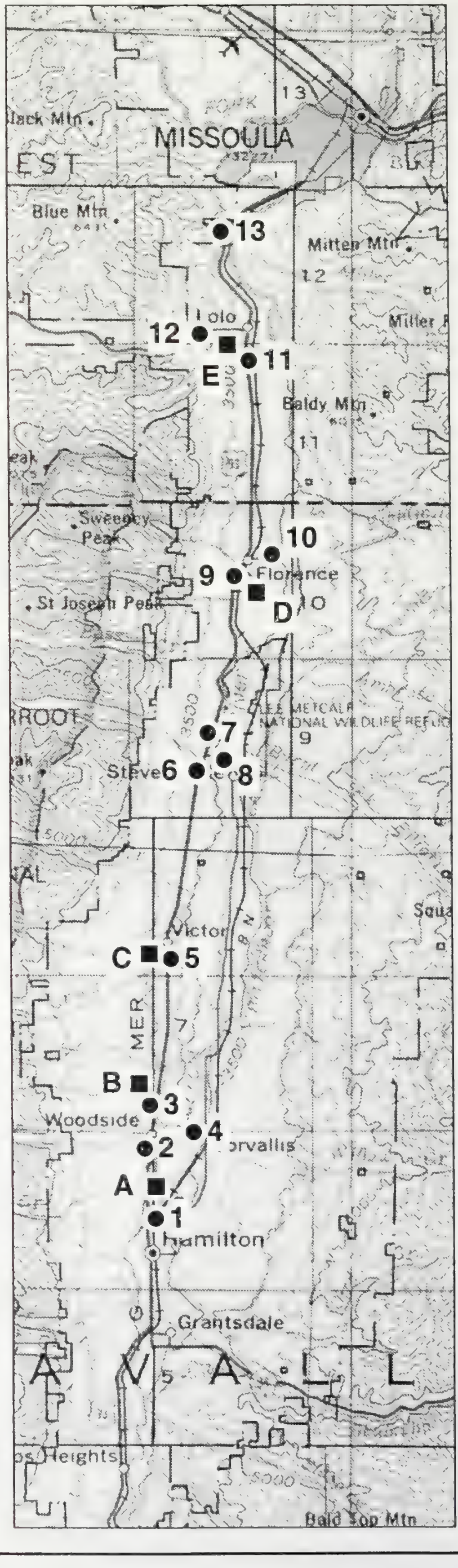
All alternatives would have some noise impacts associated with operation. Since these impacts will vary according to the width of the roadway and number of lanes, each alternative has specific impacts as will be discussed below.

Also, common to all "build" alternatives are construction - generated noise impacts. Common construction noise sources would include earth moving equipment, generators and compressors, vehicles (trucks and tractors), and impact equipment. Construction noise would be short-term and limited to the length of the construction period. These noise impacts would depend on the type, amount, and location of construction activities in relation to sensitive receptors.

During construction, noise levels would increase at sensitive receptors near construction activities. More receptors would be exposed to construction noise in the communities of Lolo, Florence, Victor, Woodside, and Hamilton; while fewer receptors would be exposed along the rural, undeveloped sections of US 93. Maximum noise levels from construction activities are estimated by the US EPA to range from 60 to 106 dBA at 15 m (50 ft) and 57 to 94 dBA at 60 m (200 ft). Since various equipment would be turned off, idling, or operating at full power at any given time, average L_{eq} noise levels during the day would be less than these maximum noise levels.

Specific Impacts: Table 4-2 shows the predicted PM peak hour L_{eq}(h) traffic noise levels projected at the five critical receptor locations, both for existing conditions and future conditions for the "no action" and "build" alternatives. Additional information for comparison purposes is the distance of the receptor from centerline and the actual field measured existing noise levels, which generally tend to be less than the predicted noise levels since the measurements may not have coincided with peak hourly traffic.

FIGURE 4-1
NOISE MEASUREMENT STATIONS AND CRITICAL RECEPTORS



LEGEND:

1 ● Station Location

A ■ Critical Receptor

N

TABLE 4-2
PREDICTED PM PEAK HOUR L_{eq}(h) TRAFFIC NOISE LEVELS (dBA)

Critical Receptor	Location	Distance to Noise Source (ft)	Existing Measured Noise Levels	Existing Conditions[1]	Future "No Action"	Future Modified 2-lane	Future 4-lane Undivided	Future 4-lane Divided	Future 5-lane	Future Preferred Alternative
A	Blodgett Park Picnic Area	115	66	68	70	70	70	70	70	70
B	Woodside Mobile Homes	80	65	69	71	71	71	73	71	71
C	Victor Victor Park	210	54	57	59	59	59	59	59	59
D	Florence 415 Florence S Loop	310	59	59	61	61	61	61	61	61
E	Lolo Delarka Drive Bitterroot Meadows Subd	180	60	66	68	68	68	68	68	68

[1] Predicted existing traffic noise levels based on PM peak hour traffic volumes and speeds under worst-case conditions. Actual measured noise levels may vary if these worst-case conditions were not present when field measurements were made.

Under all "build" alternatives predicted future PM peak hour L_{eq}(h) traffic noise levels would range from 59 to 73 dBA at the five critical receptor measurement locations. Predicted L_{eq}(h) noise levels at receptors A, B, and E would exceed the Federal Highway Administrations' (FHWA) Noise Abatement criterion of 67 dBA for residences. This would result in a noise impact under FHWA criteria.

Future PM peak hour L_{eq}(h) traffic noise levels would increase from 2 to 4 dBA when compared to the predicted worst-case noise levels at these five receptors. Increases of this magnitude are not considered to be a substantial increase under FHWA criteria. The increase in traffic noise noted would result from greater traffic volumes and widening of the facility under the "build" alternatives.

Future traffic noise levels under the "build" alternatives would increase from 0 to 2 dBA when compared with the "no action" alternative. Since traffic volumes and speeds were assumed to be the same for future conditions, this increase in traffic noise is a direct result of the widening associated with the "build" alternatives. The levels predicted at the five critical receptor measurement locations vary slightly among these lane configuration alternatives due to small differences in the distance from proposed traffic lanes to the adjacent receptor.

For example, the 4-lane divided highway would be the widest of the lane configuration alternatives and would locate traffic lanes closer to receptors than the other alternatives. This results in a noise level at Receptor B that would be 2 dBA higher than other alternatives. This effect would be repeated for any receptors closer to the proposed roadway such as this one. Note that predicted traffic noise levels for receptors at greater distances beyond this (receptors A, C, D, and E) would be the same under all "build" alternatives and the preferred alternative.

On the other hand, adding additional lanes to US 93 would reduce noise from acceleration and deceleration of vehicles. Acceleration and deceleration noise occurs on the existing 2-lane roadway due to the interaction of through traffic with turning vehicles, slower moving trucks, and recreational vehicles. Such interaction would be reduced under any "build" alternative adding lanes. Unfortunately, acceleration and deceleration noise cannot be modeled with STAMINA 2.0, which assumes that traffic is flowing freely at a constant speed. Therefore, the noise values reported for the future "no action" alternative may be slightly underestimated.

"No build" alternatives would tend to reduce these reported noise levels to the extent that they can reduce the volume of traffic on the highway. However, this reduction is not expected to be significant since it would represent a mere fraction of the 2 dBA noise increase anticipated from projected traffic growth.

Those alternatives requiring some construction (park-and-ride and passenger rail service) would also have construction noise impacts similar to those previously discussed.

The highway alignment alternatives at Silver Bridge and Bass Creek Hill would have similar noise impacts to that of using the existing alignment. At Bass Creek Hill some slight reduction may accrue from easing the grade, thereby slightly reducing the noise generated by large trucks.

The Noise Study and analyses clearly indicate the variation of noise impacts is primarily associated with distance of a receptor from the proposed centerline. Since the 4-lane divided alternative results in noise levels 0 to 2 dBA higher than other "build" alternatives, it is useful for predicting "worst case" noise levels under the proposed action at all stations along the highway corridor. Table 4-3 presents a comparison of noise levels at distances of 30, 45, and 90 m (100, 150, and 300 ft) from centerline for the predicted existing conditions, future worst-case conditions (4-lane divided), and future "no action".

TABLE 4-3
PREDICTED DESIGN HOUR VOLUME $L_{eq}(h)$ TRAFFIC NOISE LEVELS (dBA)
FOR US 93 EXISTING ALIGNMENT

Roadway Station	Location	Distance from Centerline US 93		Predicted Existing Conditions	Future "worst" Action	Future No Action
1	US 93 North of Hamilton	30 m	100 ft	69	72	71
		45 m	150 ft	66	68	68
		90 m	300 ft	61	63	63
2	US 93 South of Woodside	30 m	100 ft	68	71	70
		45 m	150 ft	65	68	67
		90 m	300 ft	60	63	63
3	US 93 North of Woodside	30 m	100 ft	68	71	70
		45 m	150 ft	65	67	67
		90 m	300 ft	60	62	62
4	Route 373 East of US 93 (near Corvallis)	30 m	100 ft	62	64	64
		45 m	150 ft	59	61	61
		90 m	300 ft	54	57	57
5	US 93 South of Victor	30 m	100 ft	66	70	69
		45 m	150 ft	64	66	66
		90 m	300 ft	59	61	61
6	US 93 South of Stevensville	30 m	100 ft	66	69	68
		45 m	150 ft	63	66	65
		90 m	300 ft	58	61	61
7	US 93 North of Stevensville	30 m	100 ft	67	70	69
		45 m	150 ft	64	66	66
		90 m	300 ft	59	61	61
8	Route 269 North of Stevensville	30 m	100 ft	63	65	65
		45 m	150 ft	60	62	62
		90 m	300 ft	55	58	58

9	US 93 South of Florence	30 m 45 m 90 m	100 ft 150 ft 300 ft	67 64 60	70 67 62	69 66 61
10	Route 203 East of Florence	30 m 45 m 90 m	100 ft 150 ft 300 ft	62 59 55	65 62 57	65 62 57
11	US 93 at Lolo South of US 12	30 m 45 m 90 m	100 ft 150 ft 300 ft	70 67 62	73 70 65	72 69 65
12	US 12 West of Lolo (outside study corridor)	30 m 45 m 90 m	100 ft 150 ft 300 ft	62 60 55	65 62 57	65 62 57
13	US 93 at Missoula City Limits (outside study corridor)	30 m 45 m 90 m	100 ft 150 ft 300 ft	72 69 64	75 71 66	74 71 66

Predicted future $L_{eq}(h)$ noise level at Stations 1 to 3, 5 to 7, 9, 11, and 13 within the corridor would range from 69 to 75 dBA at 30 m (100 ft) and from 66 to 71 dBA at 45 m (150 ft). These predicted future noise levels would exceed the FHWA Noise Abatement criterion of 67 dBA for residences that is considered to be a noise impact. Therefore residences within 45 m (150 ft) of the highway in these locations can anticipate impacts from highway noise.

Compared with the predicted existing conditions, the future $L_{eq}(h)$ noise levels at all stations analyzed would increase from 2 to 4 dBA. Increases of this magnitude are not considered a substantial increase under FHWA criteria. These increases would result from widening of the highway (adding additional lanes) and the increase in future traffic volumes. As a point of reference, the STAMINA 2.0 model indicates a doubling of traffic volume would result in an increase of 3 dBA assuming other conditions remain constant; therefore most of the noise increase comes from traffic volume rather than lane configuration.

Those alternatives adding additional lanes would move traffic closer to receptors and would increase noise levels above existing conditions. Comparing with the future "no action" alternative, the predicted noise levels are 0 to 1 dBA higher which represents an increase entirely from widening of the roadway.

A discussion of the "no action" alternative gives a final means of comparison for noise data. Since construction activities are not proposed under the "no action" alternative, no construction noise impacts would occur. However, operational impacts from noise are anticipated due to the "no action" alternative seeing a growth in traffic volume similar to all other alternatives.

Under the "no action" alternative future predicted noise levels would range from 59 to 71 dBA at the five critical receptor measurement locations analyzed. The levels at receptors A, B, and E would exceed the FHWA Noise Abatement criteria of 67 dBA for residences. This would result in a noise impact under the FHWA criteria.

Compared with noise levels predicted for existing traffic volumes and speeds, these projected PM peak hour $L_{eq}(h)$ traffic noise levels would increase by 2 dBA at all five locations, which increase in not considered substantial under FHWA criteria. The increases in traffic noise result strictly from greater traffic volumes on the highway.

Under the "no action" alternative future $L_{eq}(h)$ noise levels at Station 1 to 3, 5 to 7, 9, 11, and 13 would range from 68 to 74 dBA at 30 m (100 ft). These predicted noise levels would exceed FHWA Noise Abatement

criterion of 67 dBA for residences that is considered to be a noise impact. Note that noise impacts at a distance of 30 m (100 ft) or less exactly match those projected with any "build" alternatives; thus indicating the majority of noise impacts are directly related to increases in traffic levels and that such impacts will occur whether or not improvements are undertaken.

Overall, there are approximately eight residences in the corridor within the 45 m (150 ft) distance in which noise impacts are expected to occur. Three of these homes are adjacent to one another, the others are individually located throughout the corridor. Commercial buildings are allowed a slightly higher level before impacts occur. There are approximately 29 buildings within the 30 m (100 ft) zone at which noise impacts to buildings would be expected. Most of these buildings are in the "urban" areas such as Victor and Florence, or in other areas of strip development such as Woodside. None of the buildings are for public use.

Indirect, Secondary or Cumulative Impacts: Indirect impacts on ambient noise levels in the corridor will occur from a larger population and its attendant residential and business development of the area. As indicated above, this growth will result in an increase in traffic volume using transportation facilities, which in turn will increase noise levels. Since these increases are expected to occur to nearly the same extent without improvements to the transportation facilities, indirect or cumulative impacts associated with proposed actions considered will be negligible.

Mitigation: Federal regulations require that noise abatement measures be considered if a traffic noise impact is identified. Since noise impacts have been identified, such a consideration must be made for the proposed improvements. This analysis should also account for the reasonableness of providing noise abatement.

Noise barriers could reduce noise levels during operation of the highway. Since noise barriers must be continuous and uninterrupted to be effective, their use does not appear practicable in this application since numerous driveways and approaches exist along the highway in areas where noise impacts will occur. Specifically, the critical receptors themselves have direct access to the highway and such breaks in the noise barriers would negate their effectiveness.

Furthermore, the high cost of providing noise barriers compared to the low number of residences that might benefit from them appears prohibitive. The estimated cost for providing a noise barrier to a given property is about $25,000. The aggregate cost of $200,000 to mitigate eight residences (20 persons) is not practical. Noise barriers could also adversely affect visual quality to and from commercial buildings and residences adjacent to the highway. For these reasons, noise barriers are not considered reasonable to be included with proposed improvements.

Widening or adding additional lanes on the side opposite of sensitive receptors could help reduce noise impacts. Unfortunately, such a procedure usually creates a new or additional noise impact for receptors on that opposite side. Such an effort could also create a need for excessive additional right-of-way, or perhaps create impacts to wetlands or other nearby improvements that would offset the benefits to be received by noise reduction. Therefore, shifting the alignment will be considered wherever possible, but does not appear to be practicable in a large application to reduce noise impacts.

Impacts could also be reduced by land use or access control on adjacent property. This is likely not practicable in highly developed areas. However, such applications could be effective in presently rural or undeveloped area that could then greatly reduce the potential for future noise impacts on critical receptors close to the highway. A review of Table 4-3 indicates hardly any noise impacts beyond a distance of 45 m (150 ft) from the roadway. Land use restrictions prohibiting development closer to the highway than this limit will effectively eliminate noise impacts on future development.

Provision for installing interior noise insulation, acoustical doors and windows, and ventilation systems opening away from the highway could be made to reduce noise levels. However, this has no effect on

exterior noise levels and could only be done in public buildings unless permission from owners was obtained. Federal aid participation is limited to buildings in public use or for non-profit institutional use, of which there are none in the project corridor. The small number of building receptors within the 30 m (100 ft) impact limit and the fact that most are commercial in nature suggest this mitigation measure is impractical.

Reducing the posted speed on the highway could reduce future noise levels by as much as 2 dBA. However, a reduced speed limit would contribute to increased congestion, frustrated drivers, difficulty in enforcement, and would not meet the stated purposes and needs for transportation improvements. Therefore, this measure is impractical.

Adjusting the horizontal or vertical alignment of the road can be effective in reducing noise where critical receptors are found. In particular, keeping the profile of the road lower in residential areas can help by using natural topography and vegetation to screen noise. This mitigation measure should be considered in greater detail if a "build" alternative is approved for design and implementation.

Lastly, construction noise impacts can be mitigated by the following procedures:

- enclosures or barriers of construction areas
- mufflers on construction equipment engines
- substituting more quiet equipment or construction methods
- minimizing time of operation (generally daytime hours 7 am to 5 pm)
- locating equipment farther from sensitive receptors
- keeping detours away from sensitive noise areas
- staging or sequencing construction to avoid protracted activities in a given locale

To assure effectiveness of these measures to reduce construction noise at nearby receptors, these mitigation measures should be incorporated into construction plans and contract specifications.

4.6 HAZARDOUS MATERIALS

A Hazardous Material Assessment[6] was conducted of the study corridor to identify the potential risks associated with using the corridor for transportation improvements and the possibility that hazardous materials may be encountered. Section 3.6 discussed the existing setting and the methodology used to conduct the assessment. The following material discusses the general potential impacts from possible improvements in the study corridor.

Common Impacts: Since the assessment is basically a review of existing conditions, all alternatives, including "no action", have the potential for being impacted by hazardous materials existing within the transportation corridor. In general, this would consist of the possibilities of encountering the following situations:

- underground storage tanks
- electrical transformers or substations utilizing PCB's
- contaminated soil or spillage from past fueling or chemical operations
- automotive repair/salvage operations
- wood preservative treatment yards
- chemical storage or spill locations
- preserved or treated timber structures (particularly bridges)
- pavement stockpiling/preparation areas
- railroad yards and facilities
- refuse or landfill areas
- refineries, chemical plants, industrial complexes, etc.

- mine tailings or process locations

Specific Impacts: Two types of impacts related to hazardous materials are possible. The first is associated with existing contaminated areas, and the second with the possibility for future spills or contamination related to operation of the transportation facilities.

As to the former, specific sites were identified having low to moderate probability of constituting a hazardous material substance impact. In general these include the common impacts noted above.

In this case, the "no action" alternative will have minimal environmental consequence as it would not further disturb these inventoried areas. Similarly, the "no build" alternatives that do not require construction activities would also have minimal potential for impacts. However, neither would provide the opportunity for environmental clean-up. The passenger rail system has an opportunity for moderate impacts from the use of hazardous materials for railroad facilities (fuel, lubricates, and chemically treated or preserved lumber products).

"Build" alternatives, the park-and-ride, and passenger rail service alternatives would have the potential for impacts to the degree that they represent new construction and disturbance of existing soils in surface and subsurface areas. The opportunity for more numerous or greater impacts increases proportionately to the area disturbed. Thus, the potential impacts would range from minimal for park-and-ride construction to moderate for implementation of the 4-lane divided highway that disturbs the most surface area.

The second opportunity for hazardous material impacts is associated with the operation of transportation within the project corridor. More specifically, this would relate to accidents and spillage from vehicles transporting hazardous materials, and to a lesser degree the opportunity for errant vehicles disturbing or releasing hazardous materials in adjacent roadway areas during an accident (e.g. a car running into a gas pump).

For both situations, those alternatives providing the most relief from congestion, smoothing of traffic flow, and safe opportunities (more room) to avoid accidents should contribute to a reduction of accident potential and the risks of hazardous material spills associated with them. The "no build" alternatives will also provide a beneficial impact in this regard to the extent they can reduce traffic on the highway. The "no action" alternative will likely increase the opportunities for accidents and spills due to congestion increasing and limited safe opportunities for avoidance available. Commercial truck traffic on the facility is on the increase proportional to growth of the area. Additionally, recent passage of the North American Free Trade Agreement is expected to increase the proportion of commercial truck traffic even further than present levels.

The two alternate alignments are expected to have minimal impacts since they are located in areas devoid of any identified hazardous material substances.

Indirect, Secondary or Cumulative Impacts: Since opportunity for adverse impacts associated with hazardous material is minimal, and appropriate mitigation measures, spill prevention plans, etc. can greatly reduce the risk of adverse impacts associated with hazardous materials, indirect or cumulative impacts associated with these materials do not appear likely.

Mitigation: The most effective mitigation strategy is to undertake immediate environmental remediation of hazardous materials areas known to exist within the existing right-of-way. This will address immediate concerns and prevent them from interfering with future improvement actions. Secondly, coordination with and encouragement to adjacent property owners where hazardous materials are known or suspected to occur will help lead to appropriate remediation efforts; thus minimizing the potential for adverse impacts from these areas.

When hazardous materials are discovered and it appears that they will be disturbed or will need to be cleaned up, then the following mitigation measures are possible:

- excavation, removal, and disposal of contaminated soil in accordance with state-of-the art practices and regulations
- land farming (spreading contaminated soils over an evenly distributed area and providing the area with nutrients and vegetation to break down the waste products)
- removal and proper disposal of hazardous material (i.e. railroad ties) and surrounding surface soils before it is converted to public right-of-way
- paving and/or landscaping to cover or protect contaminated areas from erosion and further spread of the materials
- establishing spill prevention and containment procedures by emergency services personnel and highway maintenance authorities to quickly respond and react in the event of an accident, spill, or other inadvertent contamination
- following handling and disposal recommendations to properly care for the materials during clean-up operations

4.7 VISUAL / AESTHETICS

A discussion of the visual characteristics and aesthetic qualities of the existing corridor was given in Section 3.7. The following are general observations of visual resources and potential impacts from a qualitative point of view. Where enhancement photographs are given of "before" and "after" situations, they should be taken as a general representation of the appearance of the alternatives. Specific design details will be more fully developed during the design stages for implementation of any recommended improvements.

Common Impacts: Visual impacts will be related to the period of construction and then permanent changes to visual character. The visual character includes both views from the roadway and views of the roadway, according to the position of the viewer.

Visual impacts related to the period of construction are expected to be short-term. Although the intensity and duration of visual impacts from construction activity varies according to the amount and extent of construction required, the following elements will be common to a proportionate degree:

- scarifying, excavation, and other disturbance of surface areas for proper placement of new building materials
- mud, dust and debris related to construction activities
- removal of vegetation and clearing of topsoiled areas until vegetation is restored
- stockpiling of construction materials, equipment, supplies, and excavation
- traffic congestion related to construction activities, detouring, flagging, etc.

The growth of traffic on the highway, which is expected to occur regardless of alternatives, will likely lead to a deterioration of visual quality if additional strip development and urban sprawl along the highway is allowed to continue. Adjacent vegetation and land forms will be destroyed, greatly diminishing the character of the foreground landscape. In some cases the proximity or height of new development adjacent to the highway may also diminish or totally obscure the background landscape. Proliferation of outdoor advertising may produce a similar result.

Permanent changes to the visual quality may also occur with those alternatives requiring construction. These would likely vary in related proportion to the degree or extent of construction activity required. Several considerations include:

- expansion of highway influence through greater rights-of-way and wider pavements to accommodate additional lanes, park-and-ride areas, etc.
- addition of special design features and structure (e.g. retaining walls, guardrails, bridges, bike paths, lighting, etc.)
- potential changes in adjacent land use, including type and density (or absence) of development
- excavated or filled areas accommodating roadway grade
- accesses that are added or deleted, defined, controlled, or organized
- potential removal of adjacent vegetation or familiar structures
- obscuring or enhancing foreground and background landscape appearance and viewing opportunities

Specific Impacts: The "no action" alternative will produce substantial visual impacts. In addition to further congestion from growth of traffic, it is anticipated that further strip development and sprawl will occur; thus detracting from the visual quality of both foreground and background landscapes. A continuance of lack of access control may well alter land usage thereby changing the view of foreground landscape units, including undeveloped agricultural, riparian, or forested areas. Consequent residential, commercial, and industrial development in these areas may tend to obscure the long vistas and view of the background landscape units. Additional disorganized and uncontrolled accesses will demand driver attention, detracting from off-road visual qualities altogether.

To the extent that "no build" alternatives do not reduce congestion or allow the existing lack of access control policy to continue, they will have impacts similar to those listed for the "no action" alternative. The park-and-ride and commuter rail service (requiring construction) will have a degree of visual impacts in accordance with the construction impacts discussed in the previous section.

The "build" alternatives will also have visual impacts associated with construction. Those requiring wider right-of-way and more pavement (additional lanes) may produce greater disturbance of the foreground landscape. Visual degradation during actual construction is certain. "Build" alternatives do offer some opportunities to enhance visual quality by better blending the roadway into existing topography or land forms, creating scenic vistas, and providing a sequence of viewing opportunities emphasizing the attractiveness of both foreground and background landscape units.

The two realignment alternatives in particular provide examples of this benefit. The realignment of the Bitterroot River crossing near Silver Bridge will provide sweeping, graceful curves on the highway exiting or entering the town of Hamilton. The elimination of the substandard horizontal curvature will allow drivers the opportunity to divert some attention from the road to the surrounding landscape. Provision for a new bridge structure without the overhead visual interference of the existing truss bridge will allow the opportunity to view the adjacent wetlands and riparian areas and the wildlife and waterfowl they harbor.

Realignment in the Bass Creek Hill area allows the opportunity to blend the highway alignment more naturally into the existing terrain; thus providing graceful curves and gentle grades that will be more pleasing than the existing view-limiting guardrail and psychological disturbance of steep sideslopes dropping into the river area. The more open vista afford by elimination of the guardrail allows the opportunity to view eastward across the river down into the Lee Metcalf Wildlife Refuge, while at the same time adding emphasis to the background landscape vistas of the Bitterroot mountains to the west and Sapphire mountains to the east.

The 5-lane alternative is particularly detracting to visual quality through its broad expanse of pavement, encouragement for increased access (if used with permissive access control), and association with urbanization and development. The associated development and outdoor advertising detract from visual quality as previously discussed.

Cut and fill areas can also create visual impacts. Visual detraction can occur from excessive cuts and fills for those alternatives that are wider and flatter. On the other hand, proper balance of cut and fills in blending

with existing topography (e.g. Bass Creek Hill area) can combine to make the view both of and from the road more attractive.

"Build" alternatives also offer the opportunity to incorporate landscaping or revegetation in immediately adjacent areas that can greatly enhance visual quality if properly coordinated.

The preferred alternative, being a combination of 4-lane undivided and 5-lane will both enhance and detract from visual opportunities. In the urban areas where existing development has already provided little visual value, the 5-lane segments will accommodate the existing development and will perpetuate much of the same visual distractions. In rural areas use of the 4-lane undivided will keep the width of the roadway to the minimum possible while reducing congestion and smoothing traffic flow, which will then provide increased viewing opportunities. It also allows blending to existing topography and the opportunities to perpetuate existing land use and associated visuals through proper use of access control. Figures 4-2 and 4-3 help visualize the "before" and "after situations in both the typical undeveloped and developed areas within the project corridor, respectively.

Indirect, Secondary or Cumulative Impacts: The lack of land use and access controls and the existence and proliferation of "strip growth" areas along US 93 has severely detracted from viewing opportunities and visual quality. A continuance of these conditions, such as exist with the "no action" or some of the "no build" alternatives, will further degrade visual quality; therefore constituting a cumulative impact to those already existing. Similarly, the "build" alternatives that rely on permissive access control and encourage densification may have further negative impacts in areas already deficient in viewing opportunities.

Mitigation: Much can be done in terms of mitigation to reduce adverse visual impacts and enhance opportunities to improve viewing or vista opportunities. Possible ideas include the following:

- Carefully designing line and grade to match existing topography as best possible, use curvalinear alignment to break up long tangent sections, and design pull-out areas for vistas and viewing opportunities.

- Designing cut and fill areas to match surrounding ground as best possible, eliminate guardrail, flatten or naturally round slopes, and remove visual barriers (e.g. daylighting cut sections where possible).

- Using narrower sections or structures to protect sensitive areas, reduce disturbance, minimize fills, bridge over vegetative riparian area, preserve habitat, and cross floodplains at the narrowest possible spot.

- Preserving existing vegetation, leaving trees within the right-of-way wherever possible, promptly revegetating disturbed areas using native vegetation, landscaping, reclaiming, providing vegetative screening of unsightly areas, selectively clearing, and reducing erosion potential.

- Developing and implementing land use planning policies to protect scenic resources, control land use, protect undeveloped areas, limit (or encourage) access, enhance park and recreational opportunities, and set aside conservation or scenic easements.

- Employing beautification measures in urban areas to provide decorative lighting, conversation corners, tree or shrub pockets in sidewalks, and other similar measures to preserve or enhance community character and provide cohesion.

- Burying utility lines underground and utilize vegetative screens to hide utility installations or other unsightly developments wherever possible.

FIGURE 4-2
VIEW OF 4-LANE UNDIVIDED ALTERNATIVE

Existing Rural two lane highway ("before")

Four lane undivided highway ("after")

FIGURE 4-3
VIEW OF 5-LANE ALTERNATIVE

Existing urban two lane highway ("before")

Five lane undivided highway ("after")

- Maintaining the landscaping by planting, pruning, mowing, cleaning up, and encouraging citizen and community involvement in enhancing the visual attractiveness of the transportation corridor.

B. BIOLOGICAL ENVIRONMENT

4.8 VEGETATION

Section 3.8 gave background information on vegetation within the project corridor. The Biologic Resources Report[7] inventoried the existing resources and discussed the anticipated impacts. Information that follows summarizes that effort. Impacts to vegetated areas associated with wetlands are more thoroughly reviewed in Section 4.9.

Common Impacts: The "no action" and "no build" alternatives will produce minimal or no impacts on vegetative communities. This is primarily associated with not having to disturb additional ground in a major way for construction. The park-and-ride and commuter rail will see some construction disturbance, but it will be in areas previously disturbed or already developed to the point that further impacts on vegetation will be minimal.

All "build" alternatives will require disturbance of additional ground for construction and enlargement of the facility. This disturbance will require clearing of some areas previously vegetated resulting in the direct loss of grasses, shrubs, and trees. Similar disturbances of wetland areas will also result in direct loss of wetland vegetation unless mitigation is used to offset the loss.

Specific Impacts: Although sensitive plant species are thought to occur in the project corridor, none were found during field review. It is unlikely that any sensitive plant species would be impacted by any of the alternatives.

Specific impacts are associated primarily with the "build" alternatives. Loss of vegetated areas would occur in direct proportion to the area needing to be disturbed for construction of any alternative. Examination of Table 4-6 (later in this chapter) provides a relative comparison of the amount of vegetative disturbance expected for each of the "build" alternatives in nearly direct proportion to the amount of additional right-of-way required.

The least impact will be the 2-lane modified followed by the 4-lane undivided, the preferred alternative, the 5-lane, and the most impact is expected for the 4-lane divided alternative. A similar proportional analysis of impacts to wetland vegetation can be obtained by consulting Table 4-4 in the next section.

The Silver Bridge realignment impacts vegetation because it calls for constructing roadway across naturally vegetated ground where there has been little or no disturbance. Similarly, the Bass Creek Hill alignment will see some disturbance to vegetated areas due to the westerly shift into areas of present vegetation.

None of the impacts to vegetation are considered to be significant and impacts to sensitive plant species are not anticipated. Upon completion of construction, disturbed areas will be reclaimed and reseeded or will re-establish naturally helping to replace some of the vegetation loss to construction.

Indirect, Secondary, or Cumulative Impacts: Since primary impacts to vegetated areas are considered to be minimal, no adverse cumulative or indirect impacts are anticipated.

Mitigation: The following mitigation measures may be used to help reduce or eliminate impacts to vegetation that may occur from implementing recommended improvements:

- Limit the area of disturbed land and the duration of construction.
- Restore and reseed disturbed areas immediately after construction.
- Relocate sensitive plants and protect nearby populations if such are found.
- Develop and implement aggressive weed prevention and eradication program.
- Consider developing a landscaping plan and providing renewed vegetative communities and beautification schemes throughout the corridor.

4.9 WETLANDS AND WATERS OF THE UNITED STATES

There are numerous wetland areas within the project corridor. Section 3.9 presented background information on existing wetland areas with their associated functions and values. That section also contained aerial photographs depicting the specific locations of wetlands, along with a tabulation of the type of wetlands, size, and assessment of the functions and values at each location.

The wetlands evaluation[8] thoroughly inventoried all wetlands and projected the potential impacts to them in both general and specific terms for each of the alternatives being considered. The document is on file with MDT and should be considered as an indispensable resource for thoroughly understanding wetland issues and impacts associated with the alternatives that have been studied.

The information following in this section presents the important highlights and conclusions of that study and related documentation concerning wetlands. It also documents a concerted effort to avoid and minimize wetland impacts. More specific information on surface waters and water quality is found in Section 4.2 and information on fill required for stream crossings is in Appendix C.

Corps of Engineers Section 404(b)(1) Evaluation: The US Army Corps of Engineers (COE) is a cooperating federal agency in the preparation of this environmental document and evaluation of the environmental impacts herein identified. Additionally, the COE has direct jurisdictional and regulatory responsibility regarding wetlands and waters of the United States and potential impacts to them. Accordingly, a Draft Section 404(b)(1) Evaluation has been prepared to more thoroughly treat information regarding wetlands and waters of the United States and the potential impacts associated with the proposed actions set forth in this study. A copy of that evaluation is included in Appendix C of this report, which document serves as an important reference for presenting and assessing impacts to these sensitive areas.

In issuing a section 404 Permit, the COE must demonstrate compliance with the Clean Water Acts' Section 404(b)(1) guidelines. These guidelines set forth a goal of restoring and maintaining existing aquatic resources. Permit issuance is allowed only for the least environmentally damaging, practicable alternative. No discharge of materials into wetlands or waters of the United States can be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact to the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.

The least damaging alternative is to be selected first through avoidance of impacts, then minimization of impacts, and lastly through compensatory mitigation of losses. Representatives of the COE will be carefully reviewing the Section 404(b)(1) evaluation and the contents of this EIS to assure these conditions are properly satisfied prior to issuing a permit for any proposed actions.

Coordination: Thorough coordination regarding wetlands has been organized for this project, since potential impacts to wetlands represent important issues associated with the proposed action. The COE is a cooperating agency and member of the Interdisciplinary Team. They have been invited to review all studies

and documentation created for this project on wetland evaluation together with having significant input into the preparation of the Draft 404(b)(1) Evaluation and total responsibility for its review and approval.

Coordination with other agencies has come primarily through participation on the Interdisciplinary Team and presentations made to an Interagency Wetlands Group. Agencies with specific interest in wetlands evaluations and impacts, all of whom have been active participants in the Interdisciplinary Team and associated wetland discussions, include:

- US Environmental Protection Agency
- US Fish and Wildlife Service
- Montana Department of Fish, Wildlife, and Parks
- Montana Department of Transportation - Environmental Services

Specific presentations on the project, its background, anticipated impacts, and proposed mitigation were shared at meetings of the Interagency Wetlands Group to apprise them of the situation and solicit input and assistance in evaluating wetlands impacts and developing the 404(b)(1) Evaluation. Additional coordination with the Environmental Services of the MDT and representatives of the Federal Highway Administration (FHwA) has also been held.

This early coordination has been extremely effective in providing for an appreciable degree of reduction of anticipated impacts associated with wetlands and waters of the United States. Assemblage and review of the 404(b)(1) Evaluation allowed early evaluation of impacts and an initial discussion of general mitigation measures. Members of the review team insisted on the development of more specific recommendations for mitigation measures, which directly led to a significant effort to re-engineer proposed alignments to avoid or reduce wetland impacts (reported later in this section).

This close coordination with the agencies will continue into the design and construction phases to assure adherence to the committed avoidance and minimization as well as proper development and implementation of necessary mitigation measures and plans.

Direct Impacts for Alternatives: Direct impacts on wetlands are primarily associated with potential implementation of the "build" alternatives. Direct impacts are likely to be associated with loss of wetland areas due to construction, displacement of wildlife, short-term impacts to fisheries, and impacts to wetland quality through loss or reduction of functions and values. "No build" alternatives would have little or no impacts.

Table 4-4 quantifies the direct impacts to wetland acreage anticipated by implementation of the various "build" alternatives. As expected, the degree of impact is directly proportional to the degree of disturbance resulting from the proposed activity. The modified 2-lane represents the least impact since it requires the least additional disturbance beyond existing conditions for any of the "build" alternatives, especially the ability to locate proposed improvements outside of wetland areas. The degree of impacts increases until the 4-lane divided alternative. Its total disturbed area necessary for construction creates the greatest amount of anticipated direct impacts to wetland areas and therefore represents the "worst case" level of impacts.

General Evaluation of Impacts: In general, the "no action" and "no build" alternatives present the opportunity of minimizing or reducing effects on wetland communities to the greatest extent possible. Activities associated with operation of the highway are already impacting wetlands and waters of the United States and will continue to do so in an amount proportional to traffic and usage. Runoff from the highway can carry herbicides, petroleum products, sediments, deicing chemicals, and other similar products into nearby wetlands. Runoff itself may create a hydraulic loading impact. Construction activities related to development of park-and-ride lots and the passenger rail service may have direct impacts to wetlands as discussed hereafter for the "build" alternatives. However, it is not likely park-and-ride facilities will be proposed for construction in or near wetland areas.

TABLE 4-4
SUMMARY OF WETLAND OCCURRENCE AND DISTURBANCE ACREAGE

SITE #	MILEPOST		WETLAND TYPES		Function & Value Rating***	520 FT STUDY CORRIDOR		ALTERNATIVES									
								2-Lane Modified		4-Lane Undivided		4-Lane Divided		5-Lane		Preferred Alternative	
			Hydrologic Category & Veg. Dominance Type*	Hydrologic Source**		hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres
HAMILTON - VICTOR																	
1	49.00	—	2AB	I	low	0.05	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	49.25	49.50	2ABC, 3ABD	R/G	mod	0.95	2.34	0.79	1.94	0.84	2.07	0.95	2.34	0.89	2.19	0.84	2.07
3	49.70	—	2A	G(I)	low	0.35	0.87	0.27	0.68	0.29	0.72	0.35	0.87	0.31	0.77	0.31	0.77
A1	49.80	—	2A	P	low	0.02	0.06	0.02	0.04	0.02	0.04	0.03	0.06	0.02	0.05	0.02	0.04
4	49.90	—	2A, 3AB	G	low	0.14	0.34	0.06	0.15	0.06	0.15	0.07	0.18	0.06	0.16	0.06	0.15
A2	49.90	49.95	2A	P	low	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
5	49.90	50.10	2AB	G(I)	low	1.44	3.56	0.04	0.10	0.08	0.19	0.04	0.10	0.10	0.24	0.08	0.19
6	50.05	50.25	3ABC, 2ABC	R/I/G	mod	1.52	3.76	0.39	0.96	0.39	0.97	0.70	1.72	0.44	1.09	0.42	1.03
A3	50.15	—	2A	P	low	0.01	0.03	0.00	0.01	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03
7	50.30	50.50	3ABC(D), O	R	mod #	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A4	50.35	—	2A	P	low	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
A5	50.60	50.65	2A	P	low	0.03	0.07	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
8	50.60	50.80	3ABC, 1 DO	R	mod	1.44	3.55	0.25	0.62	0.27	0.66	0.50	1.23	0.31	0.77	0.31	0.77
A6	50.85	50.95	2AB	P	low	0.04	0.09	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
9	51.15	51.45	O, 1D, 2ABC	G/P(I)	mod #	2.02	5.00	0.79	1.94	0.88	2.18	1.34	3.32	1.00	2.47	1.00	2.47
10	51.45	51.85	2AB, 1D	I/G	low	2.17	5.35	0.52	1.28	0.69	1.71	0.73	1.79	0.75	1.84	0.75	1.84
11	54.40	54.65	2ABC, 3ABC,-1DO	R/G	mod	3.08	7.60	0.27	0.68	0.43	1.05	0.79	1.96	0.56	1.38	0.46	1.13
12	54.80	—	1 D	I/P	low	0.05	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A7	54.95	—	2A/B	I/P	low	0.14	0.34	0.02	0.05	0.02	0.05	0.03	0.08	0.03	0.07	0.02	0.05
15	54.95	55.30	2AB, 1D, O	G	mod #	2.20	5.43	0.06	0.16	0.09	0.23	0.10	0.25	0.11	0.27	0.09	0.23
13	55.15	—	2AB, 1D	I	low	0.09	0.23	0.02	0.06	0.02	0.06	0.06	0.14	0.03	0.08	0.02	0.06
14	55.20	55.40	2AB(C), 1DO	G/P(I)	low	0.92	2.27	0.29	0.71	0.29	0.73	0.47	1.17	0.36	0.89	0.29	0.73
16	55.45	55.50	3ABC, 2BC, O	R/G	mod	0.85	2.09	0.24	0.60	0.28	0.68	0.39	0.96	0.33	0.81	0.28	0.68
17	55.70	55.75	1D, 2AB	I(P)	low	0.45	1.11	0.06	0.14	0.07	0.17	0.09	0.21	0.07	0.18	0.07	0.17
19	55.75	56.30	2AB, 1D	G	mod #	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	56.20	—	2AB, 1D	I	low	0.21	0.52	0.08	0.19	0.09	0.21	0.11	0.28	0.10	0.25	0.10	0.25
20	56.40	56.50	2A	P/I	low	0.21	0.52	0.10	0.25	0.12	0.29	0.18	0.44	0.14	0.34	0.14	0.34
21	56.65	56.75	2ABC	G	low	1.54	3.82	0.18	0.43	0.20	0.50	0.33	0.81	0.27	0.66	0.21	0.52
22	56.90	—	1D, 2A	I(P)	low	0.05	0.12	0.04	0.10	0.05	0.12	0.06	0.15	0.05	0.13	0.05	0.12
23	57.00	57.05	3ABC, 2AB(C)	R	mod	0.49	1.22	0.22	0.55	0.23	0.58	0.40	0.99	0.27	0.66	0.23	0.58
24	57.40	57.45	2A	P/I	low	0.14	0.35	0.11	0.26	0.12	0.30	0.14	0.35	0.13	0.31	0.12	0.30
25	58.85	59.00	2AB, 1D	P/I	low	1.66	4.11	0.38	0.93	0.41	1.00	0.75	1.84	0.50	1.23	0.50	1.23
SUBTOTALS HAMILTON - VICTOR						22.27	55.03	5.21	12.87	5.96	14.73	8.63	21.32	6.86	16.92	6.40	15.80

TABLE 4-4
SUMMARY OF WETLAND OCCURRENCE AND DISTURBANCE ACREAGE

SITE #	MILEPOST		WETLAND TYPES		Function & Value Rating***	520 FT STUDY CORRIDOR		ALTERNATIVES									
								2-Lane Modified		4-Lane Undivided		4-Lane Divided		5-Lane		Preferred Alternative	
			Hydrologic Category & Veg. Dominance Type*	Hydrologic Source**		hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres
VICTOR - FLORENCE																	
26	59.50	—	2A(B), 1D	G/P	low	0.80	1.98	0.19	0.46	0.23	0.56	0.28	0.68	0.23	0.57	0.23	0.57
27	59.65	59.80	3AB, 2AB	R/G	mod	1.00	2.46	0.28	0.69	0.31	0.77	0.38	0.95	0.33	0.82	0.31	0.77
28	60.05	60.30	O, 1D, 2AB	G	low	1.71	4.23	0.19	0.47	0.19	0.47	0.74	1.84	0.27	0.66	0.19	0.47
29	60.60	60.70	2AB, 3AB	I	low	0.76	1.88	0.40	0.98	0.41	1.00	0.58	1.42	0.47	1.15	0.41	1.00
A8	61.35	61.50	2A	P	low	0.13	0.32	0.13	0.33	0.13	0.33	0.13	0.33	0.13	0.33	0.13	0.33
30	61.50	61.70	2AB, 3ABC, 2A	R	mod	1.44	3.56	0.51	1.26	0.56	1.38	0.75	1.86	0.62	1.53	0.57	1.41
31	61.85	61.90	2AB	G/I	low	0.76	1.88	0.27	0.67	0.29	0.73	0.35	0.86	0.32	0.79	0.29	0.73
32	62.20	62.30	2AB	G/I	low	1.12	2.77	0.24	0.60	0.28	0.70	0.43	1.05	0.33	0.82	0.28	0.70
A9	62.75	—	2A	P	low	0.05	0.11	0.03	0.07	0.03	0.07	0.05	0.11	0.03	0.08	0.03	0.07
33	62.85	62.95	2A, 2BC, O	G	low	0.88	2.17	0.19	0.47	0.19	0.47	0.47	1.16	0.23	0.57	0.19	0.47
34	63.20	63.55	2AB(C), 1D	G	mod	3.28	8.10	0.97	2.41	1.06	2.63	1.31	3.22	1.20	2.97	1.10	2.72
35	63.65	63.90	O, 1D, 2ABC	G	mod #	1.67	4.13	0.07	0.17	0.16	0.39	0.19	0.48	0.22	0.54	0.16	0.39
A10	63.80	63.90	2A	P	low	0.09	0.23	0.09	0.22	0.09	0.22	0.09	0.23	0.09	0.23	0.09	0.22
A11	64.20	—	2AB, 1D	P	low	0.06	0.15	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.00	0.01
36	64.20	64.30	O, 2AB, 1D	G	mod	1.03	2.55	0.37	0.92	0.48	1.18	0.55	1.35	0.54	1.32	0.51	1.25
A12	64.55	—	2A	P	low	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14
37	64.60	64.70	1DO, 2ABC, 3ABC	R/G	mod #	0.22	0.53	0.11	0.27	0.14	0.34	0.22	0.53	0.17	0.42	0.14	0.34
A13	64.75	65.05	combine w/site 38														
38	64.70	65.05	2AB, 3AB, 1OBD	G/R/P	mod #	1.70	4.20	0.74	1.86	0.87	2.17	1.07	2.63	0.99	2.44	0.87	2.17
39	65.15	—	2ABC	I/G	mod	0.17	0.43	0.03	0.06	0.04	0.10	0.04	0.10	0.04	0.11	0.04	0.11
A14	65.30	65.40	2A	P	low	0.03	0.07	0.02	0.04	0.02	0.04	0.03	0.07	0.02	0.05	0.02	0.05
40	65.40	65.50	3BC (est.)	R/G	unknown	0.40	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	65.55	65.70	2AB(C)	G	mod #	0.79	1.96	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
42	65.80	—	3AB	G/I	low #	0.14	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
A15	65.70	65.95	2AB	P	low	0.06	0.16	0.05	0.12	0.05	0.12	0.06	0.14	0.05	0.13	0.05	0.13
43	65.95	66.30	O, 1BCD, 2AB, 3AB	R/P		3.85	9.52	0.86	2.12	1.00	2.48	1.35	3.33	1.14	2.82	1.14	2.82
A16	67.50	67.60	2AB	P	low	0.15	0.38	0.06	0.15	0.06	0.15	0.08	0.19	0.06	0.15	0.06	0.15
A17	67.75	68.00	2AB	P	low	0.71	1.74	0.14	0.34	0.16	0.41	0.27	0.67	0.17	0.43	0.17	0.42
44	68.05	68.20	2A	G	low	0.79	1.96	0.27	0.67	0.27	0.67	0.50	1.24	0.31	0.76	0.28	0.69
A18	68.35	69.00	2A	P/I	low	1.21	2.99	0.28	0.70	0.30	0.75	0.29	0.73	0.28	0.70	0.30	0.75
45	69.00	69.20	2A(B)	P	low	0.52	1.28	0.48	1.20	0.49	1.20	0.50	1.23	0.49	1.21	0.49	1.20
46	69.15	69.55	2AB, O, 1D	P/G	mod #	0.66	1.63	0.63	1.55	0.63	1.55	0.66	1.63	0.63	1.57	0.63	1.55

TABLE 4-4
SUMMARY OF WETLAND OCCURRENCE AND DISTURBANCE ACREAGE

SITE #	MILEPOST		WETLAND TYPES		Function & Value Rating***	520 FT STUDY CORRIDOR		ALTERNATIVES									
								2-Lane Modified		4-Lane Undivided		4-Lane Divided		5-Lane		Preferred Alternative	
			Hydrologic Category & Veg. Dominance Type*	Hydrologic Source**		hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres
47	69.40	70.45	2ABC, 2A, 3B-C(D)	G/R	mod #	2.84	7.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A19	69.80	70.50	2A	I/G	low	0.08	0.20	0.08	0.20	0.08	0.20	0.08	0.20	0.08	0.20	0.08	0.20
48	69.95	—	2A	I	low	0.18	0.43	0.06	0.14	0.06	0.14	0.10	0.25	0.06	0.16	0.06	0.14
49	70.30	—	2AB, 3AB	P/R(I)	low	0.41	1.00	0.23	0.58	0.23	0.58	0.27	0.68	0.24	0.59	0.23	0.58
50	70.50	70.65	3BC, 2AB	R	mod #	0.13	0.33	0.09	0.22	0.09	0.22	0.12	0.30	0.09	0.23	0.09	0.23
51	71.10	71.20	2ABC	I	low	0.27	0.66	0.11	0.26	0.11	0.26	0.15	0.37	0.12	0.29	0.11	0.26
52	71.40	71.55	2AB, 3A	R(I)	low	0.55	1.36	0.30	0.75	0.30	0.75	0.38	0.95	0.32	0.80	0.30	0.75
53	71.60	—	2A, 3B	R	low	0.13	0.32	0.05	0.12	0.05	0.12	0.07	0.18	0.05	0.13	0.05	0.12
54	71.85	72.00	2AB(C), 1AD	G	mod	0.33	0.81	0.05	0.14	0.07	0.17	0.13	0.32	0.08	0.19	0.07	0.17
55	70.65	71.90	3ABC, 2ABC, 1DO	R/G	mod #	6.29	15.54	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.03	0.00	0.01
A20	72.25	72.40	2A	P(I)	low	0.19	0.46	0.06	0.15	0.06	0.15	0.06	0.15	0.06	0.15	0.06	0.15
A21	72.60	72.70	2A(B)	P	low	0.10	0.24	0.11	0.27	0.10	0.26	0.11	0.26	0.11	0.28	0.10	0.26
56	72.95	—	3BC	R	mod	0.15	0.38	0.04	0.10	0.04	0.10	0.07	0.16	0.04	0.11	0.04	0.11
A22	73.70	74.00	2AB	P(R,I)	low	0.38	0.94	0.16	0.40	0.16	0.40	0.32	0.79	0.19	0.46	0.19	0.46
57	74.00	74.20	2A, 1D, 2BC	G/R	mod	2.40	5.94	0.09	0.22	0.09	0.22	0.46	1.13	0.15	0.37	0.15	0.37
			SUBTOTALS VICTOR - FLORENCE			40.67	100.48	9.09	22.49	9.94	24.61	13.76	33.95	11.03	27.32	10.27	25.45
FLORENCE - LOLO																	
59	75.90	—	2AB	I	low	0.20	0.50	0.07	0.16	0.07	0.16	0.10	0.25	0.08	0.19	0.07	0.16
60	76.20	76.40	1DAO, 2ABC	P(I)	mod #	0.78	1.93	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
62	76.30	76.85	3AB, 2AB, 1D0	G/R	mod	1.50	3.70	0.00	0.00	0.00	0.01	0.01	0.03	0.02	0.05	0.00	0.01
A23	76.45	76.85	2A, 3A, 1D	P	low	0.31	0.76	0.30	0.74	0.30	0.74	0.31	0.76	0.30	0.74	0.30	0.74
63	76.75	77.15	1DO, 2AB	G	mod	1.12	2.77	0.41	1.02	0.41	1.02	0.75	1.86	0.45	1.10	0.43	1.06
64	76.90	77.85	1ADO, 2AB	G	mod #	6.56	16.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
A24	77.35	77.70	2A	P	low	0.41	1.02	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.00	0.00
66	78.05	79.00	2ABC, 1DO	G	mod #	1.76	4.35	0.44	1.08	0.44	1.08	0.79	1.96	0.49	1.21	0.44	1.08
A25	78.50	78.85	2A	P	low	0.04	0.10	0.03	0.06	0.03	0.06	0.04	0.10	0.03	0.07	0.03	0.06
A26	77.95	78.50	combine w/site 66														
A29	80.35	—	2ABC	G/P	low	0.06	0.15	0.03	0.07	0.03	0.07	0.06	0.14	0.03	0.08	0.03	0.07
69	80.85	81.45	1ADO, 2A	G/P	mod #	12.82	31.69	0.55	1.34	0.58	1.42	2.43	6.01	0.98	2.41	0.61	1.51
A30	80.80	81.55	combine w/site 69														
70	81.50	81.85	combine w/site 69														

TABLE 4-4

SUMMARY OF WETLAND OCCURRENCE AND DISTURBANCE ACREAGE

SITE #	MILEPOST		WETLAND TYPES		Function & Value Rating***	520 FT STUDY CORRIDOR		ALTERNATIVES									
								2-Lane Modified		4-Lane Undivided		4-Lane Divided		5-Lane		Preferred Alternative	
			Hydrologic Category & Veg. Dominance Type*	Hydrologic Source**		hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres
A31	81.55	81.90	combine w/site 69														
71	81.85	82.00	2A, 1ADO	G/P	mod	4.09	10.09	0.30	0.75	0.30	0.75	0.71	1.75	0.38	0.93	0.30	0.75
A32	81.50	82.00	combine w/site 71														
72	82.80	82.90	3BC, 2A	R/G	mod	1.37	3.38	0.07	0.17	0.07	0.17	0.16	0.39	0.07	0.18	0.07	0.18
SUBTOTALS FLORENCE - LOLO						93.96	232.17	2.20	5.40	2.23	5.51	5.37	13.27	2.84	7.00	2.28	5.63
GRAND TOTAL						107.11	260.47	16.50	40.76	18.13	44.85	27.76	68.54	20.73	51.24	18.95	46.88

* Wetland Types follow the Montana Interagency Wetlands Group (1988) as modified from Novitsky 1979.

1 Hydrologic Category = sites with permanent shallow (<6.6 ft) water [>9 mos/yr]
Vegetative Dominance Type
A - Floating
B - Rooted Submerged
C - Rooted Floating-Leaved
D - Rooted Emergent

2 Hydrologic Category = sites with seasonal or permanent water tables, but without permanent standing water
A - Herbaceous
B - Shrub
C - Forested
D - Unvegetated

3 Hydrologic Category = riparian sites adjacent to streams or rivers with seasonally saturated soil conditions
A - Herbaceous
B - Shrub
C - Forested
D - Unvegetated

** Hydrologic Source: I=irrigation supported; R=riparian; P=ponded generally due to highway or railroad berms; g=groundwater supported

*** Function and Value Rating

If a "build" alternative were to be selected, impacts resulting from the implementation would primarily be related to construction activities although some impacts would result to wildlife with future operation of the highway facility (noise and air quality, collisions, etc.). The primary impact to wetland resources in the project corridor would be the outright loss of wetlands through expansion of the existing highway facility. Direct impacts resulting from construction activities would include:

- clearing
- excavation and grading
- filling
- sedimentation and turbidity

The potential for direct losses under all proposed "build" alternatives is considerable. Table 4-4 identifies specific wetland areas as they occur in the project corridor, the degree function and values related to those wetlands, and the amount of wetland that would required for implementation of each of the "build" alternatives. The table indicates direct losses are fairly proportional to the surface width of the alternative and the area of construction impact associated with that typical section.

Accordingly, expected impacts are 16.5 hectares (40.8 acres) for the 2-lane, 18.1 hectares (44.9 acres) for the 4-lane undivided, 27.8 hectares (68.5 acres) for the 4-lane divided, 20.7 hectares (51.2 acres) for the 5-lane, and 19.0 hectares (46.9 acres) for the preferred alternative. This represents an increase of approximately 68% from the least to the greatest impact. Examination of Table 4-4 indicates only a few wetland areas that will not be impacted by any alternative and some other wetland areas where the direct losses would be the same or nearly the same regardless of the alternative.

These direct losses may also affect the level of functions and values currently provided by the existing wetlands. Primary functions and values that could be impacted include:

- nutrient retention potential
- food-chain support
- terrestrial wildlife habitat
- wildlife and aquatic diversity
- flood or runoff control

Site specific information on the functions and values of each wetland can be obtained from the field forms filled out for each and contained in Appendix B of the Wetland Evaluation Report.[7] Numbers reported under "function & value rating" in Table 4-4 are intended to be reflective of the overall importance of the combined functions and values of an individual wetland or wetland complex. Since no overall total loss or significant reduction of wetland functions and values will occur in the corridor, the analysis in this EIS looks at the general importance of functions and values, leaving the specific details of preservation/restoration of actual functions and values to the mitigation plan to be developed for the 404 permit. This is consistent with the conclusions of the Wetlands Evaluation Report that state that other than direct loss of wetland areas from implementation of any alternative, there would be no significant change in overall functions and values.

If a "build" alternative is selected for implementation, overall functioning of contiguous wetlands is not expected to be significantly affected, provided that surface water sources and hydrology are maintained through proper engineering design or other means. The abundance of surface and groundwater sources in the area suggests that careful attention to preserving (or replacing if necessary) the interconnection of wetlands by perpetuation of all hydraulic crossings and installation of new ones where necessary should maintain the hydraulics of the system.

Direct impacts will also result in potential loss of wetlands/riparian community habitat for wildlife, including displacement and possible mortality. These impacts are discussed in more detail in Section 4.10.

These direct losses will also slightly affect foraging areas for the bald eagle and peregrine falcon, which are listed as threatened or endangered species. Section 4.12 discusses these impacts in greater detail. Abundant habitat exists in the project corridor and proper mitigation will greatly reduce the potential for adverse impacts to wildlife and threatened and endangered species.

Short-term impacts to fisheries and aquatic resources may result from construction impacts to wetland areas. This is discussed more thoroughly in Section 4.11 as well as in the 404(b)(1) Evaluation in Appendix C of this report. These impacts result primarily from physical placement of fill causing turbulence, sedimentation, and turbidity, which impacts are expected to be short-term and temporary.

Efforts to Avoid or Reduce Impacts: Consultation with ID Team members indicated a strong need to develop specific mitigation strategies to reduce impacts on wetlands and waters of the United States to the absolute minimum possible. The framework and priority for accomplishing this already exists in the regulations -- look first at avoidance, then minimization, and lastly at compensatory mitigation (replacement). The overall goal consistent with 404 guidelines is to maintain or restore existing aquatic resources with no net loss of wetland areas or associated functions and values.

Initially impacts to wetland areas were evaluated by overlaying proposed alternatives on the centerline of the existing highway with the assumption that doing so would produce least impact. The degree of direct loss impact from this effort ranged from 36 to 47 hectares (90 to 116 acres). This initial evaluation of impacts indicated 107 individual wetland sites in the study of the corridor. Of those, 38 were unavoidable due to their close proximity to the existing road (such as borrow ditch areas). This left 69 sites to consider for avoidance, minimization, or mitigation.

To determine a quantitative goal for reduction of impacts, the initial evaluation was again consulted. Picking and choosing the least physically damaging alternative at a given wetland site from among the "build" alternatives, suggested it would be physically possible (although not very practical) to construct improvements that would impact a total of only 37 hectares (89 acres). The goal was then established to re-examine the preliminary design and explore other potential reduction measures to reduce the direct physical impacts to wetlands to this level or lower if possible.

Significant efforts were then made to re-engineer the alignments and grades of each alternative to examine opportunities for avoidance, minimization, and compensatory mitigation as far as impacts to wetlands and waters of the United States are concerned. The following paragraphs discuss the results of this effort:

- <u>Avoidance</u> - Eleven sites identified in the initial wetlands evaluation would not be impacted by any "build" alternative. It was determined to use best management practices during construction to avoid the possibility of any short-term impacts to these non-disturbed wetland areas.

  A closer examination of the corridor was then made with respect to wetland occurrence to determine areas where minor adjustments within the right-of-way could be made to avoid wetlands without creation of other serious environmental impacts. Four areas of primary potential were identified:

  * Milepost 50 to 50.5 - Adjust alignment westerly to avoid impacts to Bitterroot River
  * Milepost 68.8 to 69.8 (Bass Creek Hill) - Adjust alignment westerly to avoid impacts to Bitterroot River
  * Milepost 69.8 to 72.0 - Adjust alignment westerly to avoid direct impacts to wetland areas in sloughs and old meanders of the river
  * Milepost 75.2 to 79.9 - Adjust alignment westerly to avoid wetland areas existing between the highway and the adjacent railroad on the east side

  In most cases, the westerly shift of the alignment is into a non-wetland area and could be accommodated within existing right-of-way (10 m [33 ft] or less) or at least would not require a displacement or

relocation of homes or businesses. However, in a few cases the shift did impact other wetland areas, but resulted in an overall net reduction to direct wetland impacts compared to the initial evaluation.

Vertical grades were also examined since nearly all incidences of potential direct impacts to direct wetland areas are coincident with the construction of highway fills. If the gradelines can be reduced without jeopardizing safety, performance, or operation and maintenance of the highway, then a corresponding reduction to wetland areas will result. Adjustments to the gradeline were made in several locations where this could be accomplished. Unfortunately, there were several areas where the necessary height of clearance over streams and waterways to allow adequate passage of flood flows precluded grade adjustment.

The combined effects of these two efforts resulted in the ability to completely avoid another 9 to 12 wetland sites altogether, comprising 3.4 to 4.5 hectares (8 to 11 acres).

- Minimization - The redesign effort described above for avoidance also resulted in a significant reduction of direct impact area to remaining wetlands that would still be disturbed under each alternative. This reduction is in comparison to the initial evaluation of impacts that assume the highway would follow the existing centerline.

  Approximately 12 to 16 hectares (30 to 39 acres) of reduction to wetland areas was made possible by this more detailed engineering effort. The combined total reduction of impacts between avoidance and minimization amount to about 16 to 20 hectares (39 to 50 acres) -- far exceeding the goal established for such efforts.

  Other reduction measures can be investigated during the final detailed design for the proposed action that may produce further minimization of impacts. Items to be considered include:

  - *Extension of guardrails adjacent to bridge crossings.* Many stream crossings have associated wetland and riparian areas that would be directly impacted by placement of flat fills associated with approaches to the bridge or culverts over these areas. Since guardrail is already required at the bridge and for a short distance on the approach, it may be possible to extend the guardrail for a short distance; thus allowing the steepening of the approach fill sideslopes and further reducing direct wetland impacts. Although more guardrail is not desirable from a safety standpoint, it is felt the needed extensions will be minimal in most cases.

  - *Use of bridges in place of culverts.* Placement of culverts usually results in the destruction of riparian wetland areas where the highway directly crosses and also requires broad flatter sideslopes (for safety) which may further encroach on wetland areas. There may be some crossing locations where hydraulic considerations and the presence of wetland and/or riparian areas could justify the use of a bridge structure rather than a culvert. Although usually greater in cost, use of the bridge in place of the culvert may be justified in terms of hydraulic efficiency, fish passage, or reduction of adverse environmental impacts.

  - *Elimination of construction permits and detours in wetland areas.* These items are used to facilitate construction by allowing construction equipment more efficient access and eliminating traffic interference during construction. In certain areas it may be possible to construct fill slopes from above rather than getting down into wetland areas and to detour traffic on other existing routes that would not require new or additional impacts to wetlands.

  - *Use of best management practices (BMPs) to reduce short-term impacts.* Often the more considerable impacts to wetland areas are directly associated with the construction effort. BMPs have been developed to greatly reduce potential impacts associated with construction, which can provide additional minimization of impacts if properly included in the detailed design process.

- Compensatory Mitigation - Although all possible action will be taken to avoid and minimize impacts to wetlands and surface water under the proposed action, some compensatory mitigation will still be required. The major efforts made at avoidance and minimization as described above justify the use of compensatory mitigation as the last step in meeting the goal of no net loss of wetlands and their functions and values.

  It is the current policy of the Environmental Protection Agency and the Department of Army - Corps of Engineers to provide compensatory mitigation in areas adjacent to or within the project area whenever possible. After these efforts are exhausted, then off-site compensatory mitigation may be pursued.

  The over-riding concept of compensatory mitigation is to replace or mirror functions and values of wetlands that will be unavoidably lost through the proposed action. The approach to compensatory mitigation is being developed by MDT in concert with the Interagency Wetlands Group in Montana, which includes representatives of State and Federal agencies. The approach adopted by MDT policy is to follow a sequence of compensatory mitigation -- to first look at developing replacement wetlands on-site, then look at off-site opportunities, and as a last resort consider "banking" if additional replacement is still required.

  It is recognized that replacement of a natural wetland community is a difficult and challenging process that requires a lengthy period of time, careful design, thorough development of vegetation plans, and constant monitoring to evaluate the success and to modify the plans where measures have not met with success.

  While other considerations are discussed below under off-site mitigation, the key to any replacement or enhancement option is to maintain or establish a reliable source of water to the new area. Even though wetland hydrology is the most difficult parameter to replicate or create in newly constructed wetlands, it is felt the prevailing conditions in the project corridor (and Bitterroot Valley) are conducive to providing both surface and groundwater sources that can be utilized to increase the chances for long-term success in wetland mitigation.

  Surface water sources are abundant in the streams flowing down from the Bitterroot Mountains across the study corridor to the Bitterroot River. Groundwater also makes its way through sand and gravel layers interspersed with clay lenses that perch the groundwaters at relatively shallow levels throughout much of the area. It is these very conditions that have created the frequency of wetland occurrences in the project area and the prevalence of such conditions greatly increases the chance for successful mitigation.

  In fact, such has already occurred at the Lee Metcalf National Wildlife Refuge that is adjacent to and immediately east of the project corridor. MDT and other agencies collaborated on a successful project to expand existing wetlands at that site through the creation of additional wetlands on the property. The result has been very successful in replicating, and to some extent enhancing, functions and values present in the adjacent, naturally occurring wetland areas. Thirteen hectares (32 acres) are available as credit for compensatory mitigation.

  A description of the sequential considerations for compensatory wetland mitigation follows:

  - *On-Site Mitigation:* The definition used for on-site mitigation is any area within reasonable proximity (1.6 km [1 mi]) of a disturbed wetland area. Use of on-site mitigation has generally been discouraged by the biological experts who studied the corridor. Presently, there is a high incidence of deer kill resulting in over $700,000 of property loss annually within the study corridor. A special study on the deer kill problem was commissioned and coordination and collaboration between that study, representatives of the Montana Department of Fish, Wildlife and Parks, and those responsible for completing the Wetlands Evaluation and Biological assessment all concur that

wetlands in close proximity to the highway contribute to the deer kill problem potential; therefore accentuating monetary losses from property damage.

There are thin ribbons of wetlands along the borrow areas of the existing highway. These areas are low in function and value with regard to wildlife habitat and are generally felt to be non-consequential in relation to the deer kill problem. However, they do provide important functions and values in terms of sediment storage, filtration, and nutrient removal from roadside runoff. These areas occur as a natural consequence of highway construction and would likely be recreated when new borrow ditches along the improved facility are constructed (or can be purposefully designed for such).

Proper coordination during engineering design, coupled with development of aggressive wetland vegetation plans and a thorough monitoring program should assure the successful recreation of many of these areas with functions and values matching existing conditions.

Another opportunity for on-site mitigation could be the enlargement of existing wetland areas adjacent to the highway that are not directly impacted by new construction. Perennial and intermittent water sources are common in these areas together with hydrologic, soil and vegetation conditions similar to the adjacent site. In most cases, it would be a straightforward matter of purchasing additional property or obtaining landowner permission to excavate the border areas to match elevations in the existing wetland and aggressively revegetate them with similar plantings.

It may be possible to expand or enhance the area around sites 15, 28, 35, 38, 61, 65, 66, 69, 70, and 71, as shown on the wetland maps of Figure 3-6. Other potential areas include between milepost 80 and 81 on the east side of the highway and old gravel pits near milepost 57, although they would likely need to be sealed and inundated with water only to a shallow depth. Many suitable wetland plant species are already available on site for propagation and planting.

Other opportunities for enhancement of existing wetlands exist. This could be accomplished by improving the hydraulic flow regimes, excavation to allow greater influence of surface water, and/or planting of additional species to provide habitat and cover. While such enhancement does not provide for 1:1 replacement of lost areas, it can provide for improvements in the functions and values of the wetlands in the area.

- *Off-Site Mitigation:* Off-site mitigation is defined as greater than 1.6 km (1 mi) from the disturbed area but within or near the study corridor. For the purposes of this project, the study corridor is approximately 3 to 5 km (2 to 3 mi) wide extending from the base of the Bitterroot Mountain foothills on the west, eastward to the Bitterroot River. US 93 essentially bisects this corridor through the length of the project. In looking at potential mitigation sites, it is important to identify criteria that will contribute to successful implementation and long-term performance for the functions and values required. Although not necessarily in order of priority, the following criteria have been established and will be considered in selecting potential off-site mitigation areas:

  a) <u>Land use and growth</u> - the west side of the Valley (through which the highway passes) has been largely developed or will be developed into subdivisions or tract development. Figure 4-5 shows the areas developed or platted for development sometime in the future. Areas where the ground is not platted for development is primarily due to its non-developable nature (floodplains or wetlands).

     To assure the success of off-site mitigations it will be necessary to avoid the future development areas minimizing the man/biota conflict that would otherwise arise. From the Figure it appears the mitigation opportunities are more prevalent on the east side where the Valley floor is flatter, the incidence of ponded surface water is greater, and large blocks of

undevelopable land are available to preserve extensive habitat and provide greater potential for successful wetland mitigation.

b) Longevity - Similar to the land use and growth discussion, wetland mitigation should be developed in areas offering the opportunity for perpetuity. Areas associated with the floodplain of the Bitterroot River will not only be replenished by surface waters on a continuing basis but by virtue of their location in the floodplain will be protected essentially forever from human development encroachment.

c) Groundwater - The hydrology of the study area is very unique. The water table is higher in the summer due to irrigation than during the winter. The geologic setting and soil stratification are conducive to perched shallow water tables that are an essential ingredient in wetland establishment and growth. Groundwater maps are available (Figure 3-2) that clearly show areas of shallow groundwater. Additional drilling can be conducted to verify the presence and availability of groundwater at a given site. This mapping can be overlain on the land use and growth maps to quickly identify the areas with maximum conditions conducive to successful wetland establishment by avoiding those areas where future development and land use changes may adversely affect groundwater hydrology.

   Having already examined these conditions, project biologists feel there is substantial opportunity for successful mitigation.

d) Distribution of "Refuge" Areas - Since wetland habitat exists throughout the Valley and the study corridor in particular, it would be advisable to assure distribution of replacement refuge areas. This distribution may help assure the success of mitigation efforts by utilizing a number of different sites to take advantage of the resources available and reducing the chances of developmental impacts affecting a large volume of wetlands all at once if the site were in only one area.

Several private landowners with suitable sites for wetland development in accordance with the foregoing criteria have been in contact with project personnel and MDT. Additionally, a local Land Trust organization has identified several other landowners that have potential interest in wetland development. Presently the most promising option is the development of the Les Schwab Site where the foregoing criteria are met and there appears to be an opportunity to develop about 20 hectares (50 acres) of wetlands in a single block. The landowner has not only shown interest but has become pro-active in coordination and development efforts to help assure successful wetland creation.

Successful on- or off-site mitigation will require careful attention to specific design details of the wetland areas in terms of hydraulics and hydrology, the establishment of an aggressive vegetation plan utilizing indigenous wetland material from nearby complexes, and the development of a thorough monitoring plan that will provide for mid-course corrections as needed. The monitoring plan would basically allow a two to three year period to observe the success of the vegetation plan and would continue to monitor the successful growth and survival over perhaps a five or even ten year period to assure the mitigation "takes" and will preserve aquatic resources and functions and values in the long-term.

- *Wetland Banking:* The last option of compensatory mitigation is the establishment of a wetland bank. Although similar in criteria, development, and establishment as the off-site mitigation described in the foregoing section, the wetland banking would generally be considered as being outside the project corridor and probably larger in size (acreage). Banking attempts to maximize the mitigation and improve the efficiency of developing large areas of wetland mitigation in a single effort.

Although banking has successfully been accomplished in other areas of the Bitterroot Valley, biologist feel the opportunities for successful off-site mitigation are high enough that wetland banking may not need to be considered. While MDT biologist are keeping an eye on banking opportunities such as the Lee Metcalf Wildlife Refuge and their potential to satisfy the compensatory mitigation requirements of several individual highway projects, the current main emphasis is on successful development of off-site mitigation areas.

Whatever is proposed, a specific detailed wetland mitigation plan will need to be prepared and approved prior to issuance of a 404 Permit.

Monitoring of Mitigative Actions: To ensure compliance with wetlands policy and increase the chance for successful mitigation efforts, inspections will be made by the Project Manager, MDT's Wetland Biologist, and other interested agency representatives before, during, and after the wetlands replacement. These inspections are likely to occur as follows:

- During the plan-in-hand visit prior to initiating development of the wetland.
- At a visit made prior to the final grading for the wetlands.
- When the wetland is planted.
- The first full summer after the completion of the wetlands construction to determine the preliminary success of the project.
- Interim inspections for each of the next three to four growing seasons.
- A final inspection in the fourth or fifth season after establishment of the wetland area to obtain enough data and observation to determine whether or not the mitigation has been successful. If not, plans can be formulated for correction or a decision made to abandon the site and try elsewhere if solutions to assure success at the site are not apparent.

Implementation of the proposed action will also be field-reviewed during construction by various agencies including MDT, the Corps of Engineers, the State of Montana - Water Quality Bureau, and the Montana Department of Fish, Wildlife, and Parks to ensure that the construction activities will not unacceptably impact surface waters or wetlands, that impacts requiring additional mitigation beyond that being foreseen and proposed are not being created, and that provisions of all the permits issued are properly being met.

Least Damaging Practicable Alternative: 404 Guidelines state:

> *"Except as provided under 404(d)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."*

The 404(b)(1) evaluation (contained in Appendix C) thoroughly treats this in section IV B. The conclusion of that analysis is that the proposed action has been carefully re-engineered, first to avoid and then minimize wetland impacts. It does, in fact, represent the least environmentally damaging, practicable alternative for meeting the stated purposes and needs identified by this study.

Specific Impacts of Proposed Action: Table 4-4 presented the specific direct land impacts to individual wetland areas associated with the various alternatives. Several wetland areas are altogether avoided and many others are greatly reduced in size compared to the initial evaluation made on the existing centerline. Figure 4-4 graphically presents the expected impacts to the unavoidable wetlands in terms of vegetative type,

hydrologic source, and functions and values for the proposed action. The similarity between the proposed action and other "build" alternatives considered strongly suggests the proportions indicated in the Figure would be representative of the other alternatives.

As illustrated in Figure 4-4, the greatest area of impacts are to herbaceous shrub areas with vegetated shallows associated with groundwater and ponded groundwater sources. Approximately one-third of the impacts are to areas with low functions and values, with the remainder being moderate and slightly better. Note that the percentages of loss indicated are in comparison to the total of that type of vegetation, hydrologic source, or function and value existing in the entire 160 m (520 ft) study corridor.

These percentages are negligible in relation to the total wetland communities and sources with their associated functions and values present in the Bitterroot Valley. However, since the degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered from a national perspective to be among the most severe environmental impacts covered by the Section 404 guidelines, these impacts will be overcome by a thorough, coordinated, compensatory mitigation effort as set forth above.

Indirect, Secondary or Cumulative Impacts: Cumulative impacts are the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material. Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such changes can result in degradation of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems.

Past losses of wetland and aquatic resources in the area and region have resulted primarily from the direct conversion of wetlands to developmental uses such as agricultural and residential/commercial development. Highway improvement projects also contributed to a lesser extent to these losses up to the time that regulations protecting wetlands were adopted and became law.

Since the time of adoption of these regulations, all federally funded projects (including nearly all transportation projects of consequence in the area and region) have been required to first avoid, then minimize, then mitigate for wetland impacts resulting in no net loss of wetlands and aquatic resources. As discussed in this section, the current proposal is governed by these regulations and appropriate steps for eliminating and reducing adverse impacts have been and are being taken to the extent possible.

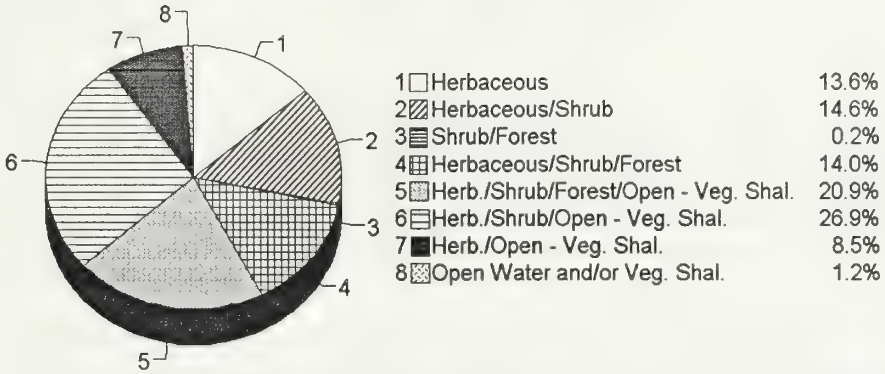
The primary source of adverse impacts to wetlands and waters of the United States comes from outright loss through current development pressures and degradation of functions and values through encroachment of new developments. Private wetlands are being filled in for projects developed locally with private funds that currently are exempt from wetland regulations. Conversion of wetlands to agricultural uses is another example of this situation.

More development creates more opportunity for both point and non-point sources of pollution degrading surface water quality and threatening aquatic resources. Timber sales and increased mining activity create an indirect potential for adverse impacts through runoff from these areas potentially degrading water quality.

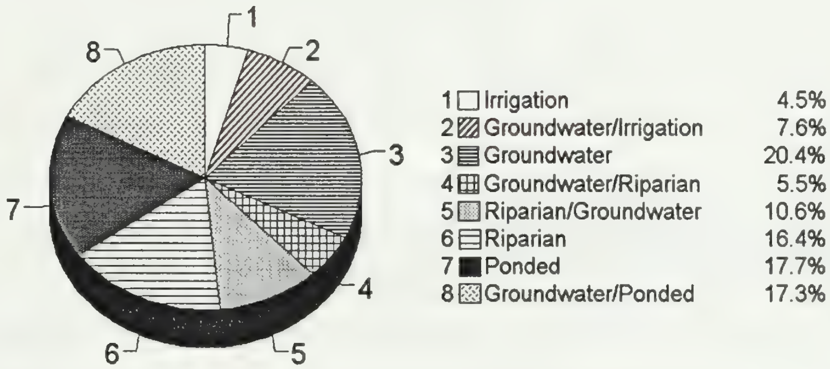
All federally funded future actions are subject to the requirements of Section 404 of the *Clean Water Act* and thus will be developed in such a way as to avoid, minimize, or effectively mitigate impacts to wetlands and waters of the United States. This includes federally funded highway projects. It is anticipated the breadth of wetland protection regulations will be expanded and the corresponding restrictions will be tightened to include regulation of private and agricultural development to the point that their direct impacts and losses of wetlands will either be avoided, minimized, or wholly compensated through mitigation. Indirect impacts such as increased surface runoff with its attendant potential for water quality degradation may become a further problem unless a corresponding increase in regulations governing such runoff is adopted.

FIGURE 4-4
WETLAND IMPACTS OF THE PREFERRED ALTERNATIVE

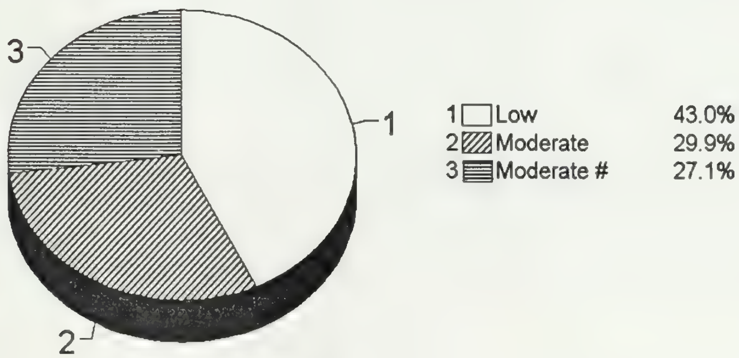
IMPACTS BY VEGETATIVE TYPE



IMPACTS BY HYDROLOGIC SOURCES



IMPACTS BY FUNCTIONS AND VALUES



As clearly set forth elsewhere in this document, the pressures for growth and development in the project area and region in general result from economic conditions, market forces, affordability of land and housing, aesthetic appeal of the area, and other conditions totally unrelated to implementation of transportation improvements. Thus, the pressures for increased development and cumulative impacts it represents are more related to local growth and land use issues independent of transportation or highway improvements.

Additional Mitigation Measures: The primary mitigation measures to reduce impacts to wetlands and waters of the United States have thoroughly been covered earlier in this article. Since the potential for erosion of disturbed areas to produce increased levels of suspended sediments and turbidity in wetlands areas may be appreciable without corrective action, the following additional mitigation measures are recommended:

- Develop and follow a highway construction standard erosion control work plan, which includes implementation of best management practices during construction.

- Ensure that the project conforms to the natural existing characteristics of the aquatic ecosystem and surrounding terrain.

- Limit the duration and the area of disturbed land.

- Restore and reseed the disturbed areas immediately after construction.

- Control storm runoff by reducing velocities, retaining sediments, and properly maintaining erosion control features.

- Ensure proper maintenance of erosion control structures and methods.

- Time disturbances of the aquatic ecosystem to avoid sensitive periods such as breeding, migration, etc.

4.10 WILDLIFE

Section 3.10 presented background information on wildlife habitat and species within the project corridor. It also contained a discussion of the deer kill problem that appears to be an important issue with regard to wildlife. A Biological Resources Report[7] was assembled to inventory the current situation and identify potential impacts to these resources. The conclusions of that report guide the following presentation.

Common Impacts: The Biological Resources Report indicated concern for four main potential impacts or issues concerning biological resources:

- loss of wetland/riparian habitat
- creation and enhancement of new and existing wetland habitats
- increased difficulties for wildlife crossings of the highway and possible habitat fragmentation
- continuance of the deer road kill problem

The first two issues with regard to wetland habitat loss, creation, and enhancement were more thoroughly treated in Section 4.9. They are primarily related to "build" alternatives, while the last two issues or impacts are associated with all alternatives.

Existing conditions in the corridor already present difficulty for wildlife crossings, especially during periods of peak highway use. Fortunately, most wildlife tends to migrate during the nighttime hours when usage of the highway is reduced. Secondly, the mere existence of the highway through the corridor (although not insurmountable) does represent a physical and physiological barrier to wildlife crossing. Continued growth

of the area will only result in more traffic using the highway; thus increasing the difficulty for wildlife crossing. Further development may well encroach into habitat areas resulting in net loss of habitat. This growth and development is anticipated to occur regardless of transportation improvements within the corridor.

Similarly, the deer road kill problem is anticipated to increase proportionate with the increase of traffic using the facility. Deer populations are also expected to increase thereby increasing the probability of collisions. Currently, some salt compounds are applied to the highway as deicers, which practice is likely to continue regardless of any alternative selected. The salt (usually mixed with sand) is an attractant to deer. The continued practice of applying these or other compounds that attract deer may add to the deer/vehicle collision occurrences.

Specific Impacts: Specific impacts to wildlife include those to mammals, birds, and reptiles and amphibians.

- Mammals - The "no action" alternative will have little impact on wildlife habitat that is not already disturbed for existing development. However, it will continue to be a partial barrier to wildlife movement and increased mortality is expected to result from an increase in vehicle/wildlife collisions commensurate with increased traffic and increasing wildlife populations. Daytime congestion and reduced speeds may contribute to lower daytime mortality rates.

  Other "no build" alternatives will have little impact on wildlife in that they do not require the displacement or loss of wildlife habitat. A slight reduction in wildlife crossing mortality may result from success of the alternative(s) in reducing traffic. Park-and-ride lots are likely to be constructed in previously developed areas and rail service would predominantly follow the existing rail corridor thereby minimizing disturbance of habitat. Passenger rail service also represents a risk of collisions with animals.

  The more notable impact on mammals is associated with the "build" alternatives. First, construction could result in a net loss of 8 to 14 hectares (20 to 35 acres) of wildlife habitat. Some habitat such as wetlands may be able to be replaced elsewhere with equal functions and values, but "re-creation" of other lost habitat areas will be difficult. This potential loss of habitat may cause a reduction in nesting and foraging opportunities and could alter local distribution of wildlife.

  Currently habitat similar to that which would be impacted is available at other locations within the Bitterroot Valley. It is expected that some of the wildlife would displace into small unoccupied habitats. Similar habitat found elsewhere may already be occupied and not able to accommodate additional population. Some wildlife may not be able to displace locally and may leave the Valley or die.

  Death of wildlife may also occur during the construction phase. Animals most likely to be at risk are those species unable to easily relocate such as young or small mammals (voles, ground squirrels, rabbits, skunks, mink, muskrat, porcupine, etc.).

  Crossing mortality is expected to continue with "build" alternatives. An additional impact will be that those requiring a wider right-of-way may increase the barrier or hesitancy to cross the facility and those with wider cross-sections and additional traffic lanes represent a corresponding increase in potential for animal/vehicle collisions. Areas requiring guardrail or replacement of bridges with culverts may provide additional barriers to crossings. Lastly, a wider right-of-way or cleared corridor may attract sick or weak animals (particularly in the winter) as they seek easier movement routes, which attraction could also increase the opportunities for collisions.

  The realignment alternatives would not create adverse impacts beyond those for the existing facility. Impacts would follow the type of improvement built on the new alignment. Elimination of the guardrail in the Bass Creek Hill area is considered to be beneficial to wildlife movement.

As shown in the Deer Kill Study[9] a high number of vehicle deer collisions already occur along the US 93 corridor. This number is likely to increase should the "no action" or "build" alternatives be employed. Traffic and deer populations are expected to increase; thereby increasing the probability of collisions. Higher speeds from free flowing traffic may reduce response time to avoid collision although this may be offset by the additional area available to try and avoid collisions for the "build" alternatives providing additional lanes and wider shoulders. In particular, the 4-lane divided alternative does offer greater visibility, but the wider width and center median may become confusing to deer and trap them within the highway right-of-way.

A great frustration in analyzing wildlife impacts and the issue of mortality from highway crossing is that the experts agree there is no clear distinction among alternatives regarding impacts and solutions to this concern. It is difficult to reach consensus when discussing lane configurations versus wildlife since the impacts vary greatly with the type and size of wildlife, and there are seemingly mutually opposing advantages and disadvantages (e.g., more lanes increases opportunity for collision, but also provides increased chances to avoid by using the extra room provided).

A summary of the major points relative to this issue is as follows:

- There are differences in the amount of habitat lost for a given alternative; the "no action" and "no build" alternative have very little and the "build" alternatives proportionately increase according to width of area disturbed. If a factor of 1.0 is assigned to "no action" then the degree of impacts would be multiplied by the following factor for each of the "build" alternatives, which is developed by comparing the width of disturbed area to the width of "no action":

  * 1.64 for modified 2-lane
  * 2.14 for 4-lane undivided
  * 2.64 for 5-lane
  * 3.71 for 4-lane divided

  The preferred alternative would have the value for 4-lane undivided or 5-lane depending on which of the two lane configurations is recommended at a given location (see Table 2-7).

- The incidence of vehicles/wildlife collisions will increase for all alternatives as a direct result of increases in traffic volume and wildlife populations.

- The "no action" and "no build" alternatives lack room to maneuver and avoid collisions; thereby potentially increasing the probability of collision and the severity of damage.

- Increased width of highway proportionately increases the barrier effect, which may discourage some crossings or possibly confuse and trap animals on the highway increasing the chance for mortality.

- Additional lanes increases the chance that an animal will be in harms way, but also provides greater opportunity for safe avoidance. Extra lanes also smooth traffic flow and reduce congestion, allowing drivers more freedom to divert attention from traffic to other concerns such as watching for wildlife.

- The best chance at reducing potential impacts to wildlife is through implementation of appropriate mitigation measures as discussed later in this section.

• <u>Birds</u> - Impacts to birds are similar to those listed for mammals. Those alternatives resulting in a loss of habitat will also impact birds and food availability. Conversely, the increase in vegetation along roadsides and borrow ditch areas resulting from increased moisture from highway runoff provides foraging and nesting opportunities for birds. Fences and utility poles provide perch sites for raptors.

Although significantly less than wildlife, the opportunity for vehicle collisions with birds is present in the same proportional relationships as for wildlife.

Construction activities with their attendant noise and disturbance of large areas will produce temporary impacts to usage of the area and may also result in mortality if nesting sites are destroyed.

- Reptiles and Amphibians - Amphibians (salamanders, toads, frogs, etc.) actively access and move through wetland areas and other habitat for breeding and egg laying. Such activity may require crossing of the highways and vulnerability to vehicle mortality. Emergent reptiles and amphibians are also subject to death or disruption if they are forced to disperse from the breeding areas to other suitable habitat prematurely. Rapid disruption or filling of wetland areas during construction will likely result in the death of amphibians and reptiles if mitigation measures are not employed.

Indirect, Secondary or Cumulative Impacts: Indirect impacts to wildlife will occur as a result of increasing human activity in the corridor related to projected future growth. Further population growth will increase the demand for land development in previously undeveloped areas, resulting in a net loss of habitat (including nesting and foraging opportunities). The increased human activity will likely result in a greater animal/human interaction that could also impact wildlife populations. The degree of impact will vary according to the type of species, habitat affected, behavior of the animal, population density, etc.

Proposed improvements would act in conjunction with other improvement and reconstruction projects of highways in northwestern Montana to result in direct loss of habitat, displace wildlife from areas proximate to the highways, and increase the opportunity for vehicle/animal collisions. Slightly increased speeds on improved facilities may result in greater mortality. However, it will likely be offset by smoothing of traffic flow and providing additional room to safely avoid collision.

Mitigation: The following mitigation and coordination measures are proposed to help reduce or eliminate impacts to biological resources that may accrue from implementing improvement recommendations. Continued and close agency coordination is important in reviewing the actual design for proper and complete integration and implementation of these measures.

- Avoidance of Habitat Disturbance

  - Carefully design highway alignment and grade to avoid and then minimize habitat acquisition or disruption. As with wetlands, provide replacement and enhancement for those areas where avoidance is not possible.

  - Provide means to reconnect fragmented habitat areas by providing crossings, hydrologic and physical interconnection, removal of barriers, etc.

  - Provide cavity habitat opportunities such as bird boxes and nesting platforms.

  - Minimize direct loss of wildlife, nesting sites, and mortality to the young by coordinating initial disturbance of ground to occur in summer, fall, or winter.

  - Minimize removal or displacement of roadside vegetation wherever possible.

  - Revegetate and replant disturbed areas with native vegetation.

  - Employ civic groups, service organizations, or interested individuals to canvas habitat areas proposed for disturbance just prior to construction to assist in trapping and relocating mammals, birds, reptiles, amphibians, etc.

- Provide perching and nesting opportunities for birds in open agricultural and grassland areas away from the highway right-of-way.

- Raptor-proof powerlines.

- <u>Animal Crossing Areas</u>

  - Construct underpasses (or use bridge for stream) for mammals, herptiles, and other wildlife in the Bass Creek area and explore the possibility for use in other locations.

  - Use bridges instead of culverts to the extent practicable in riparian areas to enhance crossing opportunities.

  - Design and install culverts or drainage pipes in a manner to facilitate wildlife passage, specifically for aquatic and small animals.

  - Avoid or minimize the use of guardrail, median barriers, fencing, or other deterrents to wildlife crossing.

  - Construct bridges with large open main spans to provide visibility of habitat on the opposite side and encourage free and open use for crossing by wildlife. In some cases "channeling" fences may be appropriate to encourage use of the crossing by wildlife.

- <u>Deer Road Kill Problem</u>

  - Initiate a driver education program to increase awareness of the problem and teach defensive driving related to animal avoidance.

  - Advertise the potential for animal collisions with additional warning signs (perhaps with flashers), labeling the area as having high deer activity on state road maps, and utilizing media and advertising to increase operator awareness.

  - Reduce or eliminate use of road salt or similar compounds in highway maintenance.

  - Remove attractive vegetation or plant non-palatable species along the highway to reduce attraction.

  - Consider the use of wildlife underpasses and bridges instead of culverts as noted above.

  - Other mitigation measures such as reflectors, mirrors, deer whistles, wildlife retention fences, etc., were generally considered by the Deer Kill Study to be ineffective in reducing animal/vehicle collisions. However, trial areas or demonstration projects may be attempted to determine if these measures may have specific application to the Bitterroot Valley.

- <u>Miscellaneous Provisions</u>

  - If found, relocate sensitive plants and protect nearby populations.

  - Develop and implement aggressive weed prevention and eradication program. Carefully design and review seed mixtures used for revegetating areas disturbed by construction to prevent weed growth and proliferation.

  - Continue coordination and communication with wildlife service agencies to enhance mitigation measures or implement new technology as it becomes available.

4.11 FISH

Existing aquatic resources were described in Section 3.11. They were also addressed as part of the Biological Resources Report[7] compiled for the study corridor.

Specific Impacts: The "no action" and "no build" alternatives are generally considered to have minimal impact on fish and aquatic resources. Application of sand and other de-icing materials to the existing roadway does find its way into water courses, but is not considered to be a significant problem at present. Similarly, many structures on the existing highway are made of wood preserved with creosote or other preservatives, which do represent a source of toxicity to aquatic resources although by now the rate of release is likely minimal.

The "build" alternatives produce a greater likelihood for impacts to occur. Construction of stream crossings, particularly replacing culverts and bridges, will result in short-term increases of suspended sediment in streams. Similarly, construction disturbance may possibly encroach on stream channels or disturb fish residing in that area; thus temporarily hindering movement, feeding, and reproduction.

Long-term impacts are associated with potential stream rechannelization with its attendant destablization of banks, increased long-term sediment loads, loss of riparian vegetation, and erosion in up or downstream areas. These in turn can result in the loss of fish cover, reduction of food availability, and changes in stream temperatures.

The streams most likely needing minor rechannelization as a result of "build" alternatives are One Horse Creek, Sweathouse Creek, and Mill Creek. The streams in these areas parallel the existing highway for a distance, which will require some channelization or relocation depending on the width of the alternative to be implemented. Alternatives requiring greater typical section widths produce greater adverse impacts.

River encroachments on the Bitterroot River may occur downstream of Blodgett Creek (milepost 50), Big Bend (milepost 69.5), and the Bitterroot Side Channel (milepost 70.5) depending on width of the alternative and alignment through the area. Proper engineering design can keep impacts to a minimum.

The Bitterroot River near Blodgett Park is a special situation. Just upstream of this area the River splits into two channels as a result of deposition from erosion occurring further upstream at the Silver Bridge crossing. The resultant creation of gravel bars has split the river into two channels. Until the mid-1980's the main flow of the river was primarily in the east channel. However, in recent years the river has moved into the west channel where a short distance downstream it parallels the existing highway just off the shoulder.

The Montana Department of Fish, Wildlife and Parks in conjunction with other agencies has considered actions in the past to restore the river to the main channel. However nothing is being actively pursued at the present time. Flow will need to continue in the west channel for fish passage, recreational activities, boating access, etc.; thus it will be important to avoid further adverse impacts in this area. Engineering design of the "build" alternatives shifts the highway alignment to the west away from the river in this area avoiding impacts altogether.

Culverts associated with the "build" alternatives can also be barriers to fish passage. The placement of the culvert, its diameter, slope, length, and configuration all play a role in determining if it will be passable to the fish. New construction increases the potential for barriers to fish passage if culverts, bridges, and other crossings are not properly coordinated and designed with protection of aquatic resources in mind. The wider the alternative, the longer the required culvert length which could add to impacts.

A potential beneficial impact of "build" alternatives is the replacement of treated timber bridges with new structures made of non-toxic material (concrete), which would be beneficial to both water quality and aquatic life.

The realignment alternatives are adjacent to or cross the Bitterroot River. The new Silver Bridge crossing alignment will require careful engineering design to avoid encroachment on aquatic resources, short-term siltation and disruption, and adverse hydraulic changes to river flows. The proposal for the Bass Creek Hill alignment is considered beneficial since it will pull highway facilities away from the encroaching river affording greater protection and reducing impacts. This westerly shift of the alignment continues northward for approximately two miles where the shift also allows minimization of impacts on an old meander of the Bitterroot River that currently serves as more of a wetland and floodplain type area.

Rare and Sensitive Fish: Of the streams crossed by Highway 93 in the study area, only Mill Creek, South Bear Creek, Sweathouse Creek, Big Creek, Sweeney Creek, and Lolo Creek are known to contain bull trout. In all cases, this species is primarily, if not entirely, confined to the upstream reaches of these streams well away from the project corridor and on national forest property. Bull trout are very rare or have been eliminated in the reaches of the streams within the study corridor. Since bull trout are only found in areas upstream of the study area, implementation of any proposed improvements is not likely to adversely affect this species.

Since Westslope cutthroat trout are not found in this area of the Bitterroot River drainage, there will be no impacts to this species.

Mitigation: The following mitigation measures should be considered to reduce the potential for adverse impacts on fish and aquatic resources:

- The engineering design of "build" alternatives should carefully consider avoidance of rivers and streams to reduce impacts. Specific elements could include:

  - shifting the alignment away from water courses
  - crossing rivers and streams as near to a right angle as possible (reduce area of impact)
  - using bridges instead of culverts wherever possible
  - providing for stabilization of stream banks by following recommended practices in accepted design manuals such as the *"Handbook for Reclamation of Placer Mined Stream Environments in Western Montana"* available from the EPA
  - carefully designing culverts to minimize water velocity and maximize fish passage by proper elevation placement
  - using flat bottom or open bottom wherever possible when a culvert is indicated
  - carefully coordinating with Montana FW&P's biologist and other interested agencies during the design and construction of all stream crossings
  - removing the Silver Bridge from the channel including abutment and piers, and removing the embankments encroaching on the floodplain

- Employ the use of best management practices for erosion control. This includes:

  - constructing silt fencing to prevent sediment from reaching water bodies
  - using straw bales in borrow ditches to prevent erosion and sediment transport
  - quickly reseeding and revegetating disturbed areas including embankments and borrow ditches
  - planting bumper strips of vegetation between construction areas and water bodies to trap sediment, control erosion, and maintain and enhance fish habitat
  - using rip-rap or other stabilization measures for channel banks
  - using clean fill if encroachment in aquatic areas is necessary
  - maintaining and protecting existing riparian vegetation where removal is not necessary

- Proper implementation of measures during construction to reduce spills and minimize disruption to instream flows through water removal or stream inhibition.

- Construction of stream crossings should be timed to minimize the impact on spawning fish. A late summer construction period will be least harmful to rainbow and brown trout. Late season construction may be undesirable for westslope cutthroat trout if they exist in the lower reaches of the streams.

- Coordination with land use planning officials and local property owners to examine land management practices near stream crossings and aquatic resources. In the past some practices have resulted in losses of riparian vegetation and development of non-point sources of pollution.

4.12 THREATENED AND ENDANGERED SPECIES

Section 3.12 specifically discusses threatened and endangered species, which for this project are the bald eagle (threatened) and peregrine falcon (endangered). The Biological Resources Report[7] also contains specific discussion relative to this important topic.

Bald Eagles: The Biological Resources Report identified two nesting territories approximately 1.6 to 3.2 km (1 to 2 mi) east of the project corridor. The proposed project is outside the primary use areas of these two territories. Therefore, any potential project activities are not likely to directly disturb the nesting eagles from these two territories.

Eagles foraging or roosting along the Bitterroot River for the most part would not likely be disturbed. Exceptions could be where US 93 is within 0.8 km (0.5 mi) of the Bitterroot River. These areas are where the highway crosses the river near Hamilton (Silver Bridge area), a 4.8 km (3 mi) stretch north of Hamilton, and a 6.4 km (4 mi) stretch from Stevensville north to beyond Bass Creek Hill. Potential construction activities in these areas may produce noise that disturbs foraging, perching, or roosting eagles. To avoid the disturbance eagles may either move up or downstream into similar available habitat. Duration of the noise impact is difficult to predict; however it would likely be temporary and it is expected eagles would return to the impacted areas once the noise disturbance has ceased.

Since unoccupied quality nesting habitat exists along the Bitterroot River and the nesting bald eagle population is expanding, it is possible that new nest territories may be established along the river in the future. Prior to commencing any construction activities, the project site and a zone of 0.8 km (0.5 mi) surrounding it should be examined for new nesting territories. Should a new nest territory be established within this zone, an amendment to the Biological Assessment addressing potential impacts will be necessary and mitigation or conservation measures may be needed to avoid impacts to nesting eagles. Such measures may include implementing timing schedules that allow for construction to occur during times that would not disturb the nesting eagles. Guidance for mitigation and conservation measures of bald eagle nesting territories is found in the Montana Bald Eagle Management Plan (USDA 1986).

Indirect impacts to eagle nesting and non-nesting may occur from construction-related activities such as at gravel sources and excess material waste sites, or from expanding recreational opportunities due to improved access. Any such areas within 0.8 km (0.5 mi) of nest territories could result in serious impacts to nesting bald eagles from noise, loss of young, habitat destruction, and reduction of foraging, roosting, and perching opportunities. Nest abandonment may occur.

Based on literature review, discussion with pertinent professionals, and results of the Biological Resources Analysis, it is concluded that any proposed actions are not likely to adversely affect bald eagles, contingent upon successful implementation of mitigation and coordination measures as discussed hereafter.

US Fish and Wildlife Service concurs that implementation of any studied alternative will not likely adversely affect the threatened bald eagle (see concurrence letter in Appendix D).

Peregrine Falcon: The Biological Resources Report indicated most of the peregrine falcon nesting and foraging areas are well south and west of the project corridor. The closest known peregrine eyerie (nesting site on cliff or mountain) is at least 8 km (5 mi) from the corridor. Therefore, direct impacts on nesting falcons and their nesting habitat are not likely.

Direct and indirect impacts to peregrine falcons would occur to foraging birds and their foraging range. The study corridor lies well within the foraging range of nesting falcons. Implementation of "build" alternatives could lead to the disturbance of up to about 15 hectares (37 acres) of wetlands that are prime foraging areas for falcons. However, much additional suitable foraging habitat such as wetlands is found outside of the study corridor. Due to this, it is expected that peregrine falcons would find suitable habitat to replace any foraging habitat disturbed by implementation of any build alternatives. Similarly, it is expected that falcons would be able to avoid noise disturbances coincident with construction.

Overall, the implementation of any proposed improvements is not likely to adversely affect peregrine falcons, contingent upon successful implementation of the mitigation and coordination measures that follow.

US Fish and Wildlife Service concurs that implementation of any studied alternative will not likely adversely affect the endangered peregrine falcons (see concurrence letter in Appendix D).

Specific Impacts: Impacts to these two species are anticipated to be minimal. In general, those alternatives minimizing or eliminating the need to disturb habitat and foraging areas will further reduce the potential for impacts. Therefore "no action" and "no build" alternatives will have less potential for impacts than the "build" alternatives.

Consultation with US Fish and Wildlife Service (USFWS): A representative of the US Fish and Wildlife Service served as a member of the Interdisciplinary Team on this project; thus USFWS has been continually updated on project issues. A copy of the Biological Assessment was submitted for review and concurrence was received (see letter in Appendix D) for the Findings of the Biological Assessment. Concurrence with MDT's determination was also given that the proposal to improve the transportation system along this 55.1 km (34.2 mile) corridor from Hamilton to Lolo by implementing one or a combination of several proposed alternatives will not likely adversely affect the threatened bald eagle or the endangered peregrine falcon. If final implementation and design is changed so as to have effects on the threatened or endangered species other than those described in the Biological Assessment, then a revised Biological Assessment will need to prepared and review for concurrence/nonconcurrence.

Indirect, Secondary or Cumulative Impacts: Since impacts associated with proposed improvements are expected to be minimal in the case of threatened or endangered species, indirect or cumulative impacts are also anticipated to be insignificant. However, while wetlands and other habitat are locally abundant in the Bitterroot Valley, such habitat is declining on a regional level in response to growth pressures and currently undefined land use policies. Although these losses are the result of activities other than proposed transportation improvements, opportunities may exist in construction and implementation of mitigation measures for other impacts to create additional or enhance some existing habitat and wetland areas to help counter the cumulative effects of growth and development throughout the Bitterroot Valley.

Mitigation: The following mitigation practices are recommended to further avoid or minimize any potential impacts to threatened or endangered species:

- Survey the project area and related sites (gravel sources, crushing sites, disposal areas, etc.) and a zone of 1.6 km (1 mi) around these areas prior to construction of any recommended alternative to determine the existence of new nest territories. If such is found the project should be reviewed again by a biologist for potential impacts to threatened and endangered species and the results documented in an amendment to the Biological Assessment. Special coordination measures or alternative plans may be necessary to avoid impacts to nesting eagles.

- Continue close coordination with the US Fish and Wildlife Service and the Montana Dept of Fish, Wildlife and Parks during the design and construction phases to assure minimization of potential impacts to these species. Features such as proposed timing of construction, location of areas to be disturbed, construction methods, sequencing, etc., should be reviewed to assure they do not produce further or unforeseen concerns that may lead to potential impacts.

- Raptor-proof overhead powerlines relocated or constructed as a result of the implementation of any alternative following criteria outlined in the raptor research report #4, "*Suggested Practices for Raptor Protection of Powerlines - The State-of-the-Art in 1981*" or other similar accepted methods if proven more effective or generally accepted at the time such construction is undertaken.

- Promptly remove road killed deer and wildlife to prevent foraging of eagles and falcons on carcasses and reduce the possible collisions with vehicles and interaction with humans.

- Carefully design proposed improvements to maximize avoidance and minimize wetland and habitat losses. Where such loss is unavoidable, develop a plan for mitigation of wetland loss that will replace functions and values, develop new suitable habitat, and enhance the quality of existing wetland and habitat areas.

- Establish buffer zones or conservation easements associated with current land use planning efforts to help mitigate the cumulative affects of habitat loss from increasing development. Alternately, expansion of existing refuge areas such as the Lee Metcalf Wildlife Refuge or developing other habitat that may be created in response to required mitigation for impacts on this or other projects will also help offset this cumulative impact.

C. HUMAN ENVIRONMENT

4.13 SOCIAL

The existing social setting was presented in Section 3.13. A Social/Economic Report[10] was developed for the project corridor drawing extensively on census information and local planning studies to develop a social picture and point out potential impacts.

Economics and land use issues which are closely related to social issues are discussed separately in Sections 4.14 and 4.15, respectively. Since there are many unique facets to social issues, the information that follows will address impacts anticipated for the primary social issues.

Growth: Section 3.13 discussed future population and growth in the project corridor. Key points from that discussion are that growth is expected to continue to remain strong, location of growth will likely be concentrated in Missoula's "bedroom" communities (more discussion in Section 4.15 - Land Use), and that the expected growth will occur regardless of the implementation of transportation improvement alternatives.

An important social concern in the project area is the growth issue -- those who desire to limit it and restrict it from changing the "quality of life" in the area, and those who desire to accommodate existing demands arising from explosive growth and strengthen the area economy in the future by providing for additional growth.

While implementation of any proposed improvements will have a negligible effect on the amount of future growth, they may have an impact on the timing of growth and the locations in which it will occur. Impacts of the alternatives with regard to the growth issue may be generalized as follows:

- Commuter traffic and congestion on US 93 may become so intolerable under the "no action" alternative that commuters (residents) may look elsewhere to locate in an area which will allow an easier and more timely commute to their destination.

- The degree of success and ease of use of transportation reduction alternatives such as park-and-ride system, commuter bus system, and passenger rail service could possibly encourage wider distribution of growth in the project corridor if reasonable commuter travel time and effort is available from these improvements.

- Improvements from "build" alternatives may reduce commuter time and effort thereby accelerating (not causing) growth in the "bedroom" communities and having a tendency to push the "tolerable limit" of commuting further south (see Section 4.15 - Land Use).

- Implementation of access control and land use planning policies will help restrict growth in rural, undeveloped areas and encourage densification in areas where growth has already occurred and a high degree of access is available. These can be implemented independently of transportation improvements. Conversely, a lack of these policies will allow uncontrolled growth to occur anywhere and everywhere in response to local demand. "Strip growth" often prevails in this latter condition.

Community Cohesion and Character: Currently, strong unity and cohesion exists within each of the individual communities in the corridor. A strong sense of community service and self-sufficiency create a certain independence and "character" of the individual communities. These same characteristics tend to create a resistance to outside influences, which suggests community cohesion and character will likely continue into the future.

The "no action" alternative produces the greatest threat to this in that the patterns of strip growth already developing along the highway threaten to "overrun" the communities and create one continuous corridor of commercial enterprise.

The "no build" alternatives may allow a similar effect. However, the opportunity to intermingle with others on shared transportation (public or private) may provide a positive social benefit as an individual's zone of influence and opportunities for social interaction increase.

"Build" alternatives run the risk of creating physical barriers (discussed in next subsection) with wider facilities through communities, but in concert with access control and land use policies, offer the opportunity to control development in rural areas and densify existing community development. This issue is important to maintaining the "rural" lifestyle appeal of the area and helping to limit growth to the existing communities and other centers of existing development. This would check urban sprawl and help maintain community identity and character.

"Build" alternatives offer the opportunity to reduce congestion and improve the ability of people to more easily access recreational facilities, schools, and businesses. People will be more willing to travel with an easier commute which will increase opportunities to meet casually and associate freely. Easier commuting will reduce travel time and stress while providing a safer, more efficient facility, all of which are considered positive social benefits.

Access, Barriers, and Isolation: Currently, the existing highway provides a natural barrier or division between the east and west sides of the highway. While this does tend to separate individual neighborhoods,

it does not separate or isolate or cause discrimination to any particular group including ethnic groups and minorities.

Under the "no action" alternative, the existing highway will become even more of a barrier as traffic volumes increase. Long platoons of vehicles will develop as a result of the congestion, which will make crossing the highway even more difficult. This greatly decreases accessibility to community services such as recreational areas, schools, churches, libraries, etc., which is considered an adverse social impact. In the worst case, unchecked congestion may reach the point where some individuals no longer desire to make the attempt to fight traffic, electing instead to do business and socialize within their own neighborhoods on their side of the highway.

"No build" alternatives offer a limited degree of relief proportional to the amount of traffic they can remove from the highway, but a majority of the congestion will remain, contributing to a barrier effect.

"Build" alternatives provide for additional lanes that will reduce congestion and smooth traffic flow, providing additional gaps and making access easier; thus reducing the "barrier" effect.

The concept of access follows this same reasoning. The more congested the highway becomes, the more difficulty is encountered in accessing adjacent properties, particularly those across traffic. The "no action" alternative allows congestion to increase; thereby negatively impacting access. The "no build" alternatives provide some relief of congestion but not enough (discussed later) to substantially improve conditions beyond "no action".

"Build" alternatives may or may not improve access depending on the configuration. The 2-lane modified and the undivided 4-lane provide very little opportunity for safe left hand turning movements which would tend to increase the barrier effect in areas requiring high access (urban or developed areas). The 4-lane divided by its very configuration creates a barrier in the median area which reduces access and increases isolation of areas on each side of the highway. The 5-lane configuration provides safe storage for left hand turning vehicles; and is therefore more appropriate for use in areas needing a high degree of access. The preferred alternative calls for use of 4-lane undivided in rural undeveloped areas where access needs are minimal and 5-lane facilities in developed areas where a high degree of access is required; thus reducing barriers and isolation to a minimum.

Displacements or Relocations: There are several properties with improvements in close proximity to the existing highway. The initial preliminary alignment, which basically followed the existing, would have required the displacement of several homes and businesses for some of the "build" alternatives. Refining the alignment to reduce impacts as described in Section 2.8 has also allowed designing minor alignment shifts to avoid or reduce having to displace businesses and residences for all alternatives.

Table 4-5 reviews the displacements or relocations necessary for all alternatives. These consist primarily of irrigation facilities, minor stream rechanneling, outbuildings (sheds), and an electrical substation. However, the 4-lane divided would result in displacement or relocation of five homes and six businesses.

TABLE 4-5
DISPLACEMENT/RELOCATION FOR "BUILD" ALTERNATIVES

Alternative	Home	Business	Other*
2-Lane Modified			10
4-Lane Undivided			10
5-Lane			10
4-Lane Divided	5	6	17
Preferred Alternative			10

* Cattle sheds, irrigation facilities, storage sheds, etc.

The "no action" and "no build" alternatives will require no displacements of any kind.

Of the two realignment alternatives, the Silver Bridge realignment does require the displacement of some sheds at a meat packing facility. There are no displacements associated with the Bass Creek Hill realignment.

Displacements will not affect any particular social groups including the elderly, handicapped, or racial or ethnic groups. Right-of-way needs are discussed in Section 4.15. At present there is plenty of replacement property available in the Valley at reasonable cost. Likewise, ample opportunities exist to replace the outbuildings and other minor improvements required to accommodate any proposed action.

Lastly, there are a number of utilities that will require relocation to accommodate any of the "build" alternatives. Careful engineering design of the alignment presents the opportunity to minimize such disturbance to the extent possible, but utility relocation is always associated with new highway construction and is usually considered to be a routine matter. Specifically, relocations of overhead and underground powerlines, electrical substations, overhead and underground telephone lines, and adjustments to water and sewer valves and manholes in the towns that have such systems will be required. Again, the extent of interference will be proportional to the width of the alternative; the 2-lane modified being the least, the 4-lane undivided being 23% more, the 5-lane 50% more, and the 4-lane divided 215% more width than the 2-lane modified.

Property Values: Values of property fronting Highway 93 have been increasing in the recent past due to pressure for commercial and residential development. Predictions of the effect of transportation improvements on property values are difficult and often unreliable since there are many other market forces involved in establishing values. In general, it can be assumed the "no action" will tend to hold values down and improvements to the highway will likely increase property values.

With "no action" the highway continues to be congested, access becomes more difficult, and urban sprawl proliferates; all of which diminish the attractiveness and potential function of adjacent properties for commercial or residential purposes. Conversely, "build" alternatives can provide a greater degree of safer access, help control land use (through land use policies and access control), and generally "dress up" the areas through the improvements resulting from new construction. The following are some basic assumptions about property value impacts for highway improvement projects based on past experience.

- The greatest impact to property values in the area has already occurred by locating the roadway there in the first place. If a new highway were being proposed in an area with no existing roadway, then substantial increases in property values would result. The presence of an existing roadway usually has

already set market value for adjacent properties; therefore the percentage of possible change is greatly reduced.

- Transportation improvements are usually in response to development already existing or rapidly occurring in the area. Property values are largely dependent on the supply and demand for developable property and the attractiveness for new development created by present development patterns. Property values are much more dependent upon a healthy economy and high demand than they are on the condition or availability of transportation facilities.

- As traffic increases along a highway, commercial property values are likely to increase as the potential return for commercial investment increases (traffic represents greater market). Values for residential properties in close proximity to the highway generally tend to decrease since living near the highway becomes less desirable in terms of traffic, noise, and encroaching commercial development.

Executive Order on Environmental Justice/Title VI and Civil Rights Act of 1964: Implementation of any alternative, including the proposed action, will not create disproportionately high and adverse human health or environmental effects on minority and low income populations. Neither will it discriminate against minority and low income populations through denying access, creating barriers, causing isolation, necessitating displacements or relocations, or lowering property values for any individuals or groups associated with these populations.

Community and Emergency Services: Community services are unlikely to be affected by any of the proposed alternatives except those which allow continuation or cause an increase in the "barrier" effect. This may reduce the extent to which community services are utilized. Local utility systems will be adjusted as required to accommodate any "build" alternatives; therefore no adverse or long-term impacts are anticipated for those services.

Access to schools is already beginning to be a problem in using and crossing the highway during periods of peak congestion. The alternatives that offer little reduction in congestion or improvement in traffic flow ("no action" and "no build") will create adverse impacts to school buses and pedestrian movement of school children required to cross the highway. Areas with high access or crossing demand may warrant future investigation to see if traffic control measures (turning lanes, pedestrian crossings, or traffic signals) may be warranted. Alternately, it may become necessary to develop alternate routes or stagger or delay starting times to avoid adverse impacts associated with peak traffic flow.

The greater width of some of the "build" alternatives (4-lane divided and 5-lane) may increase the difficulty in crossing the highway. Pedestrian and bicycle movements will see adverse impacts as a result.

Congestion and the barrier effect on the highway could further delay response times and create additional hazards for local emergency services (police, fire, ambulance, and paramedics) when responding to emergencies. Without significant improvements to existing conditions it may be necessary for emergency response personnel to develop alternate routes or plans to avoid the potential impacts of the "no action" alternative or no improvements.

The alternatives resulting in a net reduction of traffic or a smoothing of traffic flow will have a positive impact. The "build" alternatives incorporating turning lanes and wider shoulders increase the ability of emergency vehicles to maneuver safely. The 5-lane alternative is preferred by emergency services personnel for the opportunity it presents to safely bypass traffic while avoiding oncoming traffic.

Public Demand: Additional social issues are the attitudes, opinions, and desires of the general public as expressed to project personnel during public meetings on this project. The three main issues presented include:

- Doing something to reduce congestion and improve traffic flow. Public opinion survey information overwhelming indicated the construction of additional lanes to accomplish this, followed by implementation of traffic reduction measures such as those represented by the "no build" alternatives.

  The "no action" alternative will have a negative impact on this social demand since it will not reduce congestion or improve traffic flow. The "no build" alternatives will offer some improvement and reduce congestion but not in an amount sufficient to satisfy the demand. Implementation of only these actions will be considered an adverse impact to this need.

  The "build" alternatives offer additional lanes to reduce congestion and improve traffic flow, which is considered a beneficial impact for this need.

- Assuring that any improvements undertaken are consistent with and support local efforts at land use planning in order to either control growth or at least organize it to become more consistent with the social desires of those already living in the project area.

  Unfortunately, many misunderstand and believe that transportation improvements are necessary to cause land use planning and provide the mechanisms for controlling growth. Such policies and desires can be implemented completely independent of transportation improvements. Thus, none of the alternatives will have any impact on this public demand other than providing a convenient opportunity to consider land use policy implementation along with any other improvements that might be undertaken.

- Whatever improvements are decided on, they should implemented as soon as possible in order to provide more immediate relief. Many have expressed the opinion that conditions have been over-studied and further planning efforts will simply complicate and delay the implementation of seriously needed improvements.

  Again, this concern appears to be independent of impacts from the various alternatives. However, doing nothing or not doing enough to relieve existing problems will be perceived as an adverse social impact with respect to the public's demand for improvements. Implementation of alternatives that provide significant improvements to the facility will be considered as a beneficial impact.

Mitigation: Measures are available to reduce or eliminate impacts to social conditions described in the foregoing subsections. Interestingly, much of what can be done will require individual effort which when totaled together will create improvement in social conditions. Mitigation concepts include the following:

- The key to organizing or controlling growth in the area is through development and implementation of land use planning efforts. Individuals and groups concerned over the growth issue will be far more effective in addressing growth through involvement in planning efforts for land use than in attempting to control growth through a restriction of transportation facilities or improvements. While transportation planning cannot force development and implementation of land use policies, it can be crafted to be consistent with and support those measures adopted or considered to be desirable by the local community.

- Implementation of land use control policies and access control measures will do much to determine where growth will be and the timing of when it occurs. Proper combination of these two items can encourage densification of already developed areas and provide protection from or control growth in rural, undeveloped areas.

- To develop community character and improve community cohesion, individuals can become civic minded and get involved in groups and programs aimed at bettering and planning for the future character of the community in which they are located. Groups already organized may consider networking or partnering with other established groups to achieve a wider zone of influence and provide

better opportunities for successful implementation of their ideals. Additionally, efforts can be made by individuals and groups to go out of their way and include the people from other areas or neighborhoods of the community in planning, recreation, or other activities and causes.

- Engineering design of any proposed improvements should look carefully at ways to reduce barriers and potential isolation. Similarly, the design can likely be adjusted to avoid displacements or relocations and to minimize other undesirable impacts wherever possible. Studies can be made of pedestrian movements and high sidestream traffic locations to determine if warrants exist for traffic control measures, pedestrian crossings, or other similar special features.

- Where displacements of individuals or businesses may be required, careful implementation of the policies contained in the *Uniform Relocation Assistance and Real Property Policies Acquisition Act* will protect the rights of individuals and assure fair treatment and full compensation in relocating their properties or being displaced to accommodate the greater public need.

- Emergency service personnel and school traffic may plan alternate routes, modify schedules (as much as possible), or otherwise develop alternate plans to avoid problems created by congestion and the barrier effect of US Highway 93.

- Individuals and groups can do much to promote the cause of, and utilize, transportation demand management measures to reduce traffic on the highway. The high dependence on single-occupant vehicles for commuting purposes is at the root of the need to improve transportation in the corridor. Therefore, it is directly or indirectly responsible for all impacts identified by this study. The sacrifices and efforts made to make these measures successful will only bring positive benefits in terms of reduction of congestion; improvements to noise, air, and water quality; improved safety; increase energy conservation; and provide a general overall reduction of adverse impacts as identified by this study.

- Public demand is a key ingredient in cutting through bureaucracy and getting things accomplished. Individuals and groups should make their desires known to government and civic leaders, become educated in the rules and regulations that guide decision making, and be proactive in planning processes to see that their desires and ideas are incorporated.

4.14 ECONOMICS

The economic background and considerations of the project corridor were discussed in Section 3.14. Economic studies and plans by local groups[11,12] and an Economic Report[10] prepared for this study examined existing economic conditions and made projections regarding the future economy in the general project area. Information taken from those reports is summarized in the material that follows.

Economic Forecast: Currently the project area is seeing a much greater increase in population than in employment opportunities. Local economic studies suggest that even though there is a strong increase in population in the area, job openings are not expected to keep pace with this increase. Additionally, slow growth will be seen in certain sectors. Past primary industries like agriculture and manufacturing, especially lumber and wood products, will see a major decline in job opportunities.

The population increase will affect the construction, retail service, and education industries. This demand will generate job openings and increase housing starts. Major industry is expected to continue its decline, being replaced by micro and small business development made possible by the explosion in communications technology and the attendant opportunity to network with other businesses.

Aside from the local efforts to diversify, the State of Montana has targeted the tourism industry as a major contributor to the economic future of the State. This is especially true in the scenic areas of western

Montana rich in recreational resources with aesthetically appealing areas and national parks. The State is assessing a bed tax on the hotel/motel industry, which in-turn is reinvested in projects in areas that have large numbers of tourists attracted to the area. Local economic development plans also place particular emphasis on capitalizing on tourism related business opportunities and diversifying the existing economy in this area to provide further growth.

The economy of the area is far more controlled by market forces, availability of resources, existing and potential economic climate, etc., than the availability or condition of transportation facilities. To the degree that transportation facilities offer easier travel and better access they can facilitate growth and influence the area in which economic growth occurs. The concept is much the same as that set forth in the previous section under social issues related to growth; business growth and economic development follow a similar pattern where they are governed by other market forces and transportation does not play a primary role.

Common Impacts: Recent passage of the North American Free Trade Agreement has already increased commercial traffic on this important north-south international route. Forecasts are for economic activity to increase as greater economic interaction between Mexico, Canada, and the United States is achieved. The economy in the study corridor stands to benefit both in accessing the larger market and in attracting a greater component of through traffic to "stop, stay and spend" while traveling through the area.

Another common impact arises from the current presence and availability of commercial property along the highway. Industries and businesses having access to transportation facilities are in a position to remain strong and the availability of ground for further commercial development should contribute to further economic growth. As more traffic uses US 93, the value of commercial properties will likely increase.

Specific Impacts: Perhaps the greatest economic impact is associated with similar growth and land use issues. Implementation of land use policies and access control have the potential to encourage further growth and development in business areas that should strengthen the economic climate. The resulting increase may also provide additional networking and partnering opportunities that will be consistent with diversification and local efforts for providing economic development. The access and land use policies may also help to avoid business development in rural areas, reducing cost for utility systems, reducing environmental impacts, and helping preserve the "rural" quality of life. These policies can be implemented independent of transportation improvement alternatives.

Those alternatives reducing congestion ("no build" traffic reduction alternatives) or making travel easier ("build" alternatives with additional capacity) will tend to improve commercial activity. Travel along the corridor will be reduced in cost, time, and risk of accidents. These are considered positive impacts.

Similarly, "build" alternatives and implementation of access control policies will allow better access to and from business properties and safer turning movements; thereby encouraging commerce and providing for a stronger economy. This same combination may also influence the geographic distribution of business growth since the combination of easier access and safer travel and turning movements will encourage businesses to locate in those areas where it is provided. Conversely, areas with little access and without provisions for turning movements would discourage business growth.

Improvements to transportation through reduction of congestion and providing more efficient traffic flow and greater capacity ("build" alternatives) would allow greater accessibility to the work force in the area and improved connections to intermodal transportation systems. This combination and ability may prove to be attractive to future businesses wishing to locate in areas with these important resources. Any attraction of new business to the area would be a direct economic development benefit.

The "build" alternatives (and "no build" alternatives requiring construction) will provide a temporary increase demand for materials, labor and support services during construction. Additionally, it is likely the construction

work forces will seek employees from among local residents. These activities will be economically beneficial, although they will be limited to the duration of construction.

"Build" alternatives may well require loss of business parking areas, limited loss of access, and in some cases redefinition of access that may negatively impact local affected businesses. An example might be a gas station/convenience store in an "urban" area that presently enjoys continuous access along a 30 m (100 ft) frontage and parking on the highway right-of-way. When transportation improvements are constructed the area will likely have curb and gutter, the accesses limited to two approaches 12 m (40 ft) in width, and parking restricted on the highway right-of-way or at least reduced to parallel parking.

These improvements are necessary and beneficial from a safety and highway efficiency standpoint, but could potentially create some hardship when compared to existing conditions. The extent of these impacts is directly related to the width of the facility to be constructed and the need for additional right-of-way. Therefore, those alternatives narrower in width will have less impact than the wider (5-lane or 4-lane divided) alternatives.

"Build" alternatives may also result in a small amount of farm loss and loss of tax valuation of property needed for additional right-of-way. These losses will likely be insignificant to the total overall economic picture.

The "no action" alternative will be least beneficial to economic activity since it will not relieve traffic congestion and contribute to the "barrier" effect during peak travel that severely limits turning movements into businesses; therefore disrupting free access. Some businesses may choose to move elsewhere where more access and less congestion is available. Similarly, more expensive and less reliable transportation services and difficulty in accessing intermodal facilities will contribute to a less desirable business climate, reducing the attractiveness to new businesses and perhaps encouraging existing businesses to locate elsewhere.

Congestion and impeded travel time may also have a negative feedback on the tourist industry as bad experiences and word of mouth encourage travelers to take a more efficient route. Lastly, a continuation of existing conditions without land use policies or access controls may encourage "strip" development, drawing business away from some areas, or providing more competition than the market can bear.

The "no build" alternatives are considered beneficial proportional to the amount of reduction of congestion they can offer through reducing traffic. Location of park-and-ride lots and stations for buses and trains will be attractive business centers for businesses wishing to take advantage of the commuter market.

The "build" alternatives offer construction job opportunities, improved and enhanced transportation in the corridor, better access, and safer turning movements, all of which are considered beneficial from an economic viewpoint. Less desirable impacts would include elimination or disruption of parking and access along business frontage for those alternatives requiring more surface width and greater right-of-way.

The realignment alternatives are not expected to have economic impact one way or the other. The Silver Bridge realignment will require relocation of some sheds and stock yards at a meat packing plant north of town, but nearby land is readily available on which to relocate.

The preferred alternative is a combination of alternatives maximizing the opportunity for economic benefits. Access control will encourage densification of existing commercial areas and protection of undeveloped rural land. Implementation of the park-and-ride system and establishment of transportation management associations will reduce traffic and encourage multiple occupancy of vehicles. The 5-lane segments in existing and proposed commercial areas will improve access and provide safer turning movements. The 4-lane undivided segments in rural areas, protected by access control, will improve transportation and encourage inter- and intra- area commercial activity. Additional ground needed for improvements and

disruption of parking and access for those businesses already located too close to the highway should be minimal in comparison to the overall economic benefits this alternative will produce.

Indirect, Secondary, or Cumulative Impacts: The cumulative impacts of the proposed action together with other improvement projects on US 93 in western Montana will result in a more efficient transportation system that improves the efficiency and desirability of travel for commercial and industrial purposes. The cumulative effects will result in a net reduction of travel time and an increase in convenience for those wishing to travel to western Montana's regional trade centers such as Missoula. Greater access to intermodal transportation facilities will encourage use of alternate forms of transportation (other than highway) for moving goods and services. Implementation of land use planning policies by Missoula and Ravalli counties together with access control policies associated with the proposed action will tend to densify commercial activity in already developed areas. Continued growth in the area and the desirability for commuters outside of Missoula to locate in the Bitterroot will continue to provide commerce opportunities and activities in the study corridor.

Mitigation: Considerable public input was received with regard to maintaining and improving economic activity in the project area with the assumption that such development is desirable or beneficial. The following mitigation measures can be employed to encourage economic activity:

- Implementation of land use and access control policies will encourage commercial development in proper areas and reduce corresponding negative impacts if allowed to occur elsewhere.

- Local citizens should be especially vigilant about supporting local businesses to help provide a strong basis for continued economic activity and growth.

- Local business groups and organizations such as the Bitterroot Chamber of Commerce should continue economic planning and program development. They should actively pursue plans already established in seeking funding for economic development, providing for diversity to meet changing market demands and forces, trying to attract environmentally friendly businesses to the area, and developing ways to take advantage of increasing trade and tourist traffic through the area.

- Proper engineering design of improvement alternatives can do much to improve access, provide safer turning movements, enhance pedestrian and bicycle facilities and avoid negative impacts or disruption to existing business insofar as possible.

4.15 LAND USE

Land use background and issues were presented in Section 3.15. A Land Use Study[13] was prepared to identify existing efforts at land use planning and development and projections of possible land use changes within the project area. Local planning documents[11,14] also address this issue.

As discussed in the Social Section of this chapter, growth issues and the associated land use are the most intense current issue with regard to the future of the Bitterroot Valley and the proposed improvements addressed by this study. Much of the discussion in the Social Section of Chapter 3 (Section 3.13) regarding growth factors being controlled by significant prevailing conditions other than transportation availability are equally applicable to the land use issue since pressure for land use directly corresponds with growth.

Strong opinions were frequently expressed in public meetings on this project about "growth" vrs "no growth" issues and problems the area is experiencing due to lack of land use planning. Proper transportation planning requires careful coordination with existing land use policies in order to provide compatibility and avoid adverse impacts. Without such policies in-place, it is difficult to meet this challenge. Unfortunately, many citizens feel so strongly about the issue that they have seized upon transportation planning efforts as a means to develop and enforce land use planning and policies, when in fact it should be the opposite.

In view of the difficulty of this situation, the following information will look at future land uses and will present in general terms the impacts proposed transportation improvements are likely to have on land use.

Future Land Use: The study corridor will experience substantial expansion of residential and commercial land use in response to needs generated by expected growth. As previously discussed, this will occur regardless of whether or not transportation improvements are implemented or which ones are selected. The lack of existing land use plans and/or specific zoning makes predicting future land uses difficult and somewhat arbitrary. However, knowing the elements in the draft plan and examining historical and existing growth trends, the likely locations of growth and land use can be forecast. For example, Figure 4-5 shows areas platted for future development which gives a good indication of where growth is likely to occur.

One of the goals of the comprehensive plan is to recognize agricultural, commercial, and industrial enterprises as vital to an economically sound living environment. Unguided development and growth can result in incompatible land uses and insufficient distribution of public services. Accordingly, the document seeks to protect and preserve rural and undeveloped areas while concentrating or densifying development in those areas already developed. These goals are supportive of the central concept of maintaining the rural lifestyle and "quality of life" in the Bitterroot Valley.

Residential growth is anticipated to remain strong in Missoula's "bedroom" communities such as Lolo, Florence, and Stevensville. To a lesser extent, Victor and Corvallis will also see residential development as continued pressure for growth in the communities closer to Missoula begins to drive up the cost of owning a home or property.

It is also likely that residential development will occur in subdivisions already platted for development; particularly those closer to the major metropolitan areas of Missoula and Hamilton. The Comprehensive Plan will encourage development within subdivisions, particularly where homes can share water and sewer services. Access control may also tend to encourage development in subdivisions by restricting multiple frontage accesses to a single access for a subdivision area.

The locations of commercial and industrial growth will depend on whether or not and how soon a land use management plan is established and implemented. Looking at current patterns, it is likely that further extension of strip development along the highway will occur unless controls such as land use planning or access control are implemented. The most likely areas for this are Lolo, Stevensville Y-intersection, Florence, Victor, Woodside, and North Hamilton. Already congestion and difficulty in access on US 93 have created pressure for development along the Eastside Highway as motorists seek the less crowded route for a portion of their commute. Unless congestion is relieved and safer access is provided on US 93, this type of development on the Eastside Highway will likely continue.

Lastly, speculation is widely discussed that the population in the Valley will double within the next 15 years creating unmanageable pressure on land use. These projections have been made in response to the phenomenal growth rate presently being experienced and indications that it will continue for some time.

The Ravalli County Planning office is quick to point out the unlikelihood of accelerating the growth rate beyond present levels. Homes can only be built as fast as construction crews can build them and building materials are not in unlimited supply. Many of the homes currently being built are large retirement homes requiring six months to a year for construction. Also, as retired and/or wealthy people come to the area and purchase acreage for these homes (at just about any price), the land prices have increased dramatically. This trend creates a balance in the market causing some people to go elsewhere for affordable property, which in-turn should eventually soften the market and help "control" the growth rate.

Access and Access Control: Currently access to US Highway 93 is essentially unlimited; being controlled only by MDT's existing standard approach policy that provides only minimal restrictions in terms of size, location next to corners, and separation from each other. Some locations (in Victor) appear to be one

continual urban approach through the development area. Combined with the lack of land use planning policies, the lack of access control has encouraged "sprawl" of commercial development along the highway in strip type fashion. These trends are expected to continue in the absence of land use and access control policy implementation.

Access control policies can affect the distribution, location, and intensity of land development patterns depending on the type of policy implemented. Restrictive access control would have MDT buying up the rights for access, eliminating approaches altogether in some places, but more likely leaving existing approaches while prohibiting new ones without solid justification and purchase of the right through the permit process.

This policy would discourage or slow development in areas where the policy was implemented. Combined with a permissive policy in existing developed areas (discussed hereafter) the policies could have the positive effect of concentrating development around existing business areas and residential subdivisions. These higher concentrations are much more efficient for public services and help to preserve undeveloped land for agricultural and wildlife uses.

A permissive access control policy does not control new road and driveway access onto the highway. Developers would have greater flexibility in locating new residential, commercial, and industrial developments that could conflict with established land uses in the area proposed for development. Such a policy in rural undeveloped areas would encourage low density residential development, displacing agricultural lands and intruding into wetlands or other environmentally sensitive areas. This policy would also encourage a continuance of strip growth development both in existing development areas and in encouraging their further expansion.

A situational access control policy would allow MDT flexibility to enact either restrictive or permissive policies based on highway design, traffic conditions, land use objectives, and other public policy statements. This policy also provides for a case-by-case review of proposed accesses and their associated development. For example, in a given area access may be allowed to small commercial enterprises but denied to a major shopping mall that would otherwise create serious congestion problems and land use conflicts.

The tabulated descriptions of the preferred alternative given in Chapter 2 present recommendations for where these various access control policies should be implemented. In general, the concept is to allow a more permissive access in areas already developed or experiencing growth (to encourage densification) and restricting access in agricultural and rural undeveloped areas in order to preserve those functions.

The nature and configuration of the alternatives themselves also have an impact on access independent of access control policies. To the extent that an alternative facilitates or impedes access, it will tend to have a corresponding influence on local land use patterns by encouraging or discouraging development, respectively.

All alternatives would perpetuate existing city and county road accesses to the highway. The alternatives would also continue the existing private and commercial accesses. Future access would be determined by access control policies rather than by alternative. In a few instances, implementation of access control may buy the rights to and eliminate some existing access where other access to the highway is readily available. For example, this is likely to occur in the Florence to Lolo segment where currently only three or four private accesses to US 93 exist and elimination of them will provide smoother and safer traffic flow on the highway.

The "no action" alternative provides for essentially unlimited access. Similarly, other "no build" alternatives should not affect current abilities to access properties along the highway. However, these alternatives do not provide for substantial relief of traffic congestion on the facility which could adversely affect access by restricting the free flow of turning movements and cross traffic.

The "build" alternatives also impede access as related to turning movements. Turning movements across opposing traffic presents a greater potential for impact. Alternatives without a center turning lane or turn bay tend to make left hand turning movements more difficult, particularly for those without an additional lane for through traffic to safely maneuver around the turning vehicle. The 4-lane divided alternative presents an absolute physical barrier against left hand turning movements except at areas where turn bays are constructed.

"Build" alternatives may also facilitate access as related to turning movements. The 2.4 m (8 ft) shoulders on all alternatives improves the opportunity to access adjacent property and re-enter the highway for turning movements in the same direction of traffic. Similarly, alternatives providing additional lanes will smooth the traffic flow; thus providing better gaps for accommodating turning movements.

The 5-lane alternative best provides for left hand turning movements and access to the far side of the highway by providing vehicles the opportunity to safely exit the traffic stream and wait for a turning opportunity. Similarly, vehicles returning from access on the far side of the highway may use the center turning lane as a safety zone to wait for a gap in traffic or as an acceleration lane to safely merge with through traffic. For these reasons, the center turn lane is highly recommended in areas of dense development and high access demand.

The two alternate alignment alternatives have no appreciable impact on access or adjacent land use.

Rights-of-Way: Alternatives not requiring new construction have no need for additional right-of-way. "Build" alternatives and construction of park-and-ride lots, bus stations, commuter rail systems, and associated facilities will all require some additional right-of-way or land purchase.

Although MDT does have a preferred policy for the establishment of minimum fixed right-of-way widths on highway facilities (whether needed or not), the policy was not considered in determining additional right-of-way needs for proposed improvements on this project in order to keep the proposed rights-of-way to the absolute minimum possible. In several areas the corridor is already highly developed and land values could be moderate to high depending on existing land use and future development potential. The overall guiding concept for right-of-way design was to reduce and minimize needed right-of-way to the greatest extent practicable.

In most areas right-of-way limits were positioned just far enough outside the limits of construction (toe of fill slopes or top of cutslopes) to allow construction equipment the opportunity to properly construct highway sideslopes. In a few areas where adjacent improvements (homes or businesses) were close enough to the highway to be impacted, and where doing so would not create a safety concern, sideslopes were slightly steepened in very limited areas to reduce the limits of construction and the needed right-of-way. Existing right-of-way limits were used wherever possible in order to minimize additional right-of-way.

The alternatives requiring construction will require some purchase of residential, commercial, industrial, agricultural, and undeveloped property in order to properly accommodate new construction. The Social Impacts Section indicated that displacements or relocations of farm outbuildings (sheds, barns, garage, etc.), utilities (overhead powerlines, substations, etc.), and irrigation ditches would be necessary to accommodate new construction of any alternative. Fortunately, no homes or businesses will need to be relocated for most alternatives although a few will be left immediately adjacent to the right-of-way in close proximity to the highway (where they are presently located). The 4-lane divided will require displacement/relocation of five homes and six businesses.

Acquisition of property from residential land use areas will consist mainly of yard landscaping, driveway/access areas, and parking areas. Land required from agricultural operations is more thoroughly discussed in the next section but will include a mix of crop and pasture land. Table 4-6 summarizes the required right-of-way for the various alternatives.

FIGURE 4-5
PROJECTED LAND USE

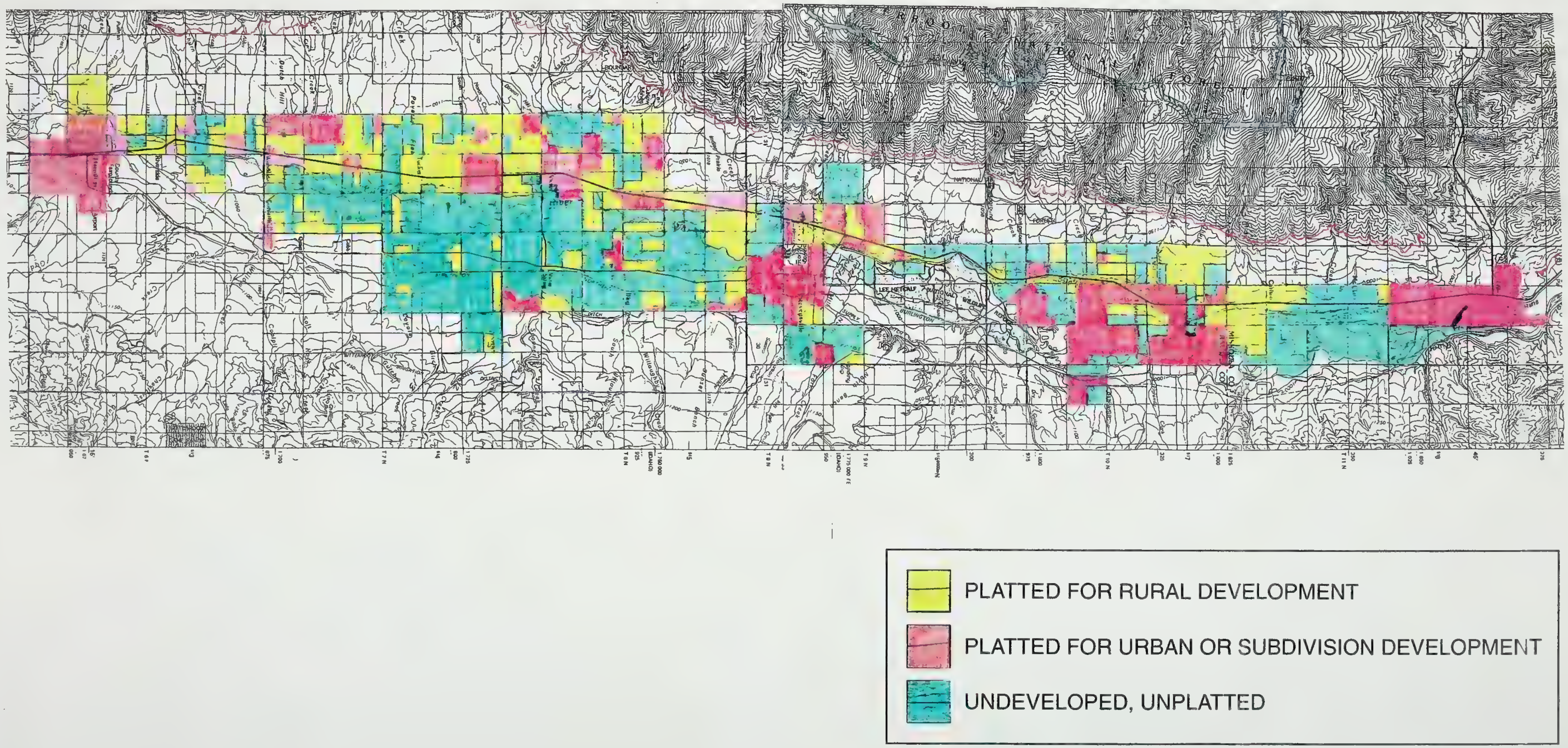


TABLE 4-6
REQUIRED RIGHTS-OF-WAY

Alternative	Hamilton - Victor		Victor - Florence		Florence - Lolo		Corridor Total	
	hectares	acres	hectares	acres	hectares	acres	hectares	acres
No Action	-----	-----	-----	-----	-----	-----	-----	-----
"No Build"								
Park-and-Ride	0.4	1.0	1.0	2.5	0.8	2.0	2.2	5.5
Commuter Bus	0.3	0.7	0.7	1.7	0.6	1.5	1.6	3.9
Passenger Rail	0.2	0.5	0.5	1.2	0.4	1.0	1.1	2.7
"Build"								
2-lane Modified	14.0	34.6	20.1	49.7	0.7	1.8	34.8	86.1
4-lane Undivided	16.1	39.8	21.2	52.4	0.7	1.8	38.0	94.0
4-lane Divided	30.1	74.4	49.5	122.3	3.1	7.7	82.7	204.4
5-lane	18.3	45.2	24.5	60.5	0.7	1.8	43.5	107.5
Preferred Alternative	16.9	41.8	22.3	55.1	0.7	1.8	39.9	98.7

The amount of right-of-way required for the alternate alignments at Silver Bridge and Bass Creek Hill are included in Table 4-6 for each of the "build" alternatives. If existing alignments are followed at these locations, a reduction in needed rights-of-way of 5 to 6 hectares (12.4 to 14.9 acres) would result.

Common Impacts: Implementation of transportation improvement alternatives will not substantially affect the total amount or rate of new development occurring the Bitterroot, but will have some influence on the characteristics and distribution of this development. As discussed in sections on Social and Economic impacts, the primary factors for determining land use include:

- city and county land use plans regulations and practices
- access restriction or permission
- location of business areas and employment centers
- social/economic constraints
- landowner and developer resources and preferences toward development
- availability of other developable lands
- subdivision and health regulations
- financial market conditions

Of these, the land use planning will probably become the principal factor. Such planning can range from general guidelines (i.e. found in a comprehensive plan) to actual ordinances and restrictions (i.e. found in zoning ordinances). The comprehensive plan being developed for Ravalli County will establish guidelines discouraging land use changes in agricultural and undeveloped rural areas while seeking to facilitate and encourage densification of existing development. Proper selection of access control policies in conjunction with any transportation improvements recommended can provide support for these policies; thus increasing the probability of meeting the stated goals. However, it should be noted that these policies can be implemented independently of any proposed improvement actions.

As set forth previously in the Future Land Use Section, commercial land use will likely be concentrated around areas where it presently exists. This includes the small urban areas in the corridor and the major intersections with traffic feeders such as the Woodside Crossing and Stevensville Y-intersection. Residential development will likely occur in areas already platted for its development and adjacent to areas already being residentially developed. Figure 4-5 showed the anticipated future land use by examining county records of areas already platted or planned for specific development. Comparison of the figure to existing land use shows a number of presently undeveloped areas that are planned for future development.

Specific Impacts: The "no action" and "no build" alternatives will not disrupt present land uses, but could play a significant role in determining future land use. If land use policies and access control are not implemented, the tendency for strip development in the corridor will likely increase. In the worst case, the corridor could become one continual commercial development leading to loss of community identity and cohesion. The barrier effect coinciding with continued and increased traffic congestion could make access difficult in certain areas; thus diminishing the value for commercial development and perhaps even causing businesses to locate elsewhere. The congestion, noise, pollution, and inconvenience will further discourage residential development along the highway corridor.

These alternatives could also emphasize the current trend of development in less crowded areas away from the highway such as along the Eastside Highway corridor. Use of these areas encourages urban development, encroachment on agricultural lands, and reduction of wildlife habitat.

"No build" alternatives would provide for some reduction in traffic volume and congestion providing corresponding improvements in relation to "no action". However, the transportation demand management study and public opinion surveys (discussed in Section 4.17) indicate the usage of these alternative modes of transportation will be fairly limited so the amount of the congestion relief would be small.

Implementation of appropriate "build" alternatives could provide improved access and safer turning movements that will help sustain and develop commercial areas. Safer and easier truck access will give encouragement for industrial development in those areas suited for it. Land will be required for right-of-way and constructing the wider typical section. Some on-street parking in community areas may need to be eliminated.

The modified 2-lane alternative will not substantially increase highway capacity and therefore will maintain congestion similar to the "no action" alternative in areas where the second lane is not available. It would then have similar impacts as those discussed above for "no action". Positive impacts would result in areas where the second lane provides improved access and less congested traffic.

The 4-lane undivided alternative will provide smoother traffic flow and less congestion. Access to properties in the direction of traffic will be enhanced by the wide shoulders and the improved ability to maneuver within the traffic stream. Turning movements across highway traffic would be less convenient due to the difficulty in judging gaps in multiple lanes of traffic when crossing the highway and the lack of a refuge area to safely stop and wait for an appropriate gap in traffic. This difficulty in access across the highway would tend to discourage growth where it is used. This impact is enhanced when used in conjunction with a restrictive access control policy.

The 4-lane divided highway would severely restrict cross traffic turning movements; therefore providing considerable access control simply due to its physical configuration. Its use would be considered a beneficial impact in areas where it is desired to discourage access, but use in areas where access is desired would be a negative impact. Additional impacts are required right-of-way acquisition and construction interference due to is considerably wider width. The improved traffic flow may tend to provide some relief of traffic volumes on the Eastside Highway and development pressures there.

The 5-lane alternative provides the safest turning movements in both directions; therefore substantially improving access. Implementation of this alternative will tend to encourage development along the sides of the highway. Therefore, it would be most suitable for use in locations where development has already occurred or is planned to occur in the near future.

The preferred alternative calls for a combination of 4-lane undivided in rural undeveloped areas and 5-lane in already developed areas where greater access is required. As such, it provides beneficial impacts to the stated goals of the local land use plans which seek to discourage growth in presently undeveloped area and densify it where growth already occurs.

Indirect, Secondary, or Cumulative Impacts: As set forth in the Social and Economic sections, continued growth of the Bitterroot Valley area and project corridor are expected to occur. This growth and its attendant economic and market factors will largely be responsible for determining future land use impacts. Continued pressure for additional development is expected regardless of transportation facility improvements. The cumulative impact of this pressure will be to convert agricultural and undeveloped property to residential, commercial, and industrial development. This will produce a corresponding reduction in agricultural production capability, a loss of habitat, potential change in quality of life, and a reduction in the aesthetic appeal of the area.

A continuation of having no land use planning policies or access control along the highway will further contribute to haphazard, uncontrolled growth and development with the same types of impacts as just discussed. The eventual outcome could see the entire corridor become a "semi-urban" conglomeration of commercial and industrial development resulting from continual in-filling of presently undeveloped areas.

Another cumulative or indirect impact of the "build" alternatives concerns the commute to Missoula. It has already been established that the project area contains bedroom communities to Missoula since easy and affordable commuting is available on Highway 93 into Missoula. A reduction in traffic congestion and improvement in traffic flow and efficiency will produce a corresponding reduction in the time required to commute. Since there is a psychological "maximum" commute time, the net effect of these improvements could be to push development pressure further southward in the project corridor than presently exists due to the reduced commuting time.

According to the Telephone Survey, the average commute distance is 38 km (23.6 miles) and the average commute time is 32 minutes. This implies an average speed of 71 km/h (44 mph). If this speed were increased by 15 km/h (bringing operating speeds closer to 55 mph) by an improved highway, the average commute distance would be increased to 48 km (29.8 miles) if the "tolerable" commute time of 32 minutes stayed the same.

This additional 10 km (6.2 mi) of commuting range would have the effect of encouraging residential development beyond the existing "limits" and into this new area. This would densify the existing residential development within this sector, but may also create pressure to convert undeveloped land to residential use. While increased development of these areas would likely result from anticipated growth as a matter of course, implementation of the "build" alternatives may have the cumulative effect of accelerating this land use conversion.

Mitigation: Since land use impacts are principally affected by land use policies and regulations, the most effective means of mitigating land use impacts will be through proper planning and implementation of these policies. Other possible mitigation measures are as follows:

- The public (including individuals, groups, and organizations) should become pro-actively involved in local governmental efforts to develop and implement land use planning policies. Similarly, the cities and counties should continue efforts to develop and implement these policies as it will produce the most significant effect on determining future land use, growth areas, and rate of development.

- Access control policies should be adopted to compliment, support, and enhance the land use planning policies established by local governments. A combination of permissive, restrictive, and situational access control will help achieve the goals in the currently proposed comprehensive plan to densify existing development and protect rural, undeveloped, and agricultural properties. In addition to helping determine where development will occur, these access control policies can also be used to help control the rate of growth and development.

- Engineering design of transportation improvements can be done in such a manner as to minimize the need for additional right-of-way, perpetuate access to existing developed areas, and provide for the orderly accommodation of access from areas proposed for development.

- Where the need for new right-of-way is known to exist and where construction may not occur for a considerable period of time, new right-of-way should be purchased in advance in order to preserve the corridor, protect adjacent land uses, and avoid adverse land use impacts if development is allowed in the area in the interim.

- Existing features of the existing highway associated with land use such as stockpasses, frontage roads, etc., should be perpetuated to protect the land use. Similar features should be incorporated in any "build" alternatives to further preserve and enhance land use.

4.16 FARMLAND

A discussion of farmland background information was presented in Section 3.16. Additionally, a Farmland Impact Study[15] summarized existing conditions and potential impacts of project alternatives on agricultural properties in the study corridor. Figure 4-5 (previously presented in Section 4.15) is a good reference to visualize the future of farmland in the project corridor. The green areas on the figure represent vacant or agricultural lands remaining after the yellow and pink areas of residential and commercial development, respectively, are developed. Further visual representation of existing conditions is contained in the aerial photographs of Appendix A.

Coordination with Soil Conservation Service (SCS): The SCS has been represented in project planning and development by participating as a member of the Interdisciplinary Team. Additionally, coordination concerning farmland issues with SCS has occurred culminating in submission of a Form AD1006 for computation of farmland conversion impact ratings. Results of that analysis will be included when received.

Data on the form submitted for analysis includes the impacts anticipated from implementation of the proposed action. Significant engineering refinement of the line grade was undertaken to reduce impacts to wetlands, businesses, residences, and important farmlands. The minimal amount of prime farmland or farmland of state-wide importance required to implement the proposed action will likely result in a conversion impact rating less than the threshold level where avoidance or specific mitigation will be required.

Specific Impacts: The "no action" and the "no build" alternatives will not impact farmlands. Those that do require construction (park-and-ride, rail stations , etc.) are likely to occur in areas already developed and would not require the direct conversion of farmland for these purposes.

"Build" alternatives will require additional agricultural and undeveloped property for construction purposes. Table 4-7 presents the anticipated impacts of the "build" alternatives on prime farmland and farmland of statewide importance. Alignments of each of the alternatives were engineered to reduce needed impacts.

TABLE 4-7 FARMLAND IMPACTS OF "BUILD" ALTERNATIVES										
Approximate area impacted by each "build" alternative										
Milepost From - To	2-lane Modified		4-lane Undivided		4-lane Divided		5-lane		Preferred Alt	
	hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres
68.4 to 68.4	0.02	0.05	0.02	0.05	0.10	0.30	0.06	0.14	0.06	0.14
69.2 to 69.4	0.00	0.00	0.00	0.00	0.40	0.90	0.00	0.00	0.00	0.00
82.7 to 82.9	0.30	0.80	0.30	0.80	0.60	1.50	0.30	0.80	0.30	0.80
TOTAL AREA	0.32	0.85	0.32	0.85	1.10	2.70	0.36	0.94	0.36	0.94

The 4-lane divided roadway produces the greatest impact and the 2-lane modified (due to its narrower width in many locations) provides the least impacts. Other alternatives are in between proportional to their required area of disturbance. The totals shown are quite minimal compared to the 291 hectares of farmland in the study corridor and over 11,300 hectares of prime and state-wide important farmland total in the Bitterroot Valley.

Indirect, Secondary, or Cumulative Impacts: Rapid growth and development of the Bitterroot Valley and western Montana in general is resulting in direct conversion of farmland to residential, commercial, industrial, and other uses of which transportation improvements are a small part. Significant growth is expected in the Bitterroot Valley area regardless of whether transportation improvements are implemented. This growth will directly impact the conversion of farmland to other development, including conversions of prime farmland and farmland of state-wide importance.

Planning for transportation improvements elsewhere in western Montana, particularly along segments of US 93 from Evaro to Polson and also from Somers to Whitefish also result in conversion of farmland to highway usage. The aggregate total of these conversions is insignificant when compared to that resulting from the growth pressures currently occurring and expected to continue throughout western Montana.

Mitigation: The following mitigation measures may be considered to reduce or avoid direct conversion of farmland to other uses:

- Adoption and implementation of land use policies can protect and preserve agricultural areas from being converted to other usage.
- Proper implementation of access control policies in conjunction with land use regulations can provide additional protection by discouraging development in agricultural areas and encouraging development in more suitable areas.
- Proper engineering design can be employed to avoid farmland areas if at all possible and minimize the need for acquisition and conversion of agricultural properties to highway use through adjusting horizontal and vertical alignments and steepening cut and fill slopes wherever possible.

providing for crossing the Bitterroot River, the structure is now to the point where it is becoming increasing more difficult and costly to maintain. Additionally, the constriction of the limited span is causing hydraulic problems in the river. Realignment at Bass Creek Hill allows for improved grade and sight distance and elimination of steep sideslopes, especially on the river side where negative impacts from erosion and bank stability are already occurring.

Traffic: It has already been established that US 93 within the study corridor carries appreciably more traffic than any other rural 2-lane highway in Montana. As noted in the sections discussing social impacts and land use, growth in the area is expected to continue regardless of the condition of transportation facilities. This growth will bring a corresponding increase of traffic in the corridor, which traffic is expected to have predominantly the same components and characteristics as at present. Passenger cars, small trucks, pickups, and vans will still comprise the vast majority of the traffic. The predominant purpose of travel will likely continue to be commuting or business oriented with peak usage still centered around the early morning and late afternoon hours.

Traffic projections were made by examining trip generators in the area, land use and current growth patterns, and trip distribution. Adjustments were made for seasonal factors.

Two methods were used for projecting future traffic conditions in the corridor; first is the statistical method of least squares analysis of historical traffic data, the second is the use of demographic information provided by census records. The use of both methods produced similar results with a high degree of correlation.

Table 1-1 in Chapter 1 indicated traffic increases in the past decade on the order of 4% per year in the northern portion of the corridor and 7% to 9% annually near the Hamilton and Woodside areas. It was earlier noted the growth of the area is expected to continue at approximately 3% per year for the next 20 years in response to Valley area growth resulting from a healthy economy, attractive rural lifestyle, reasonable cost of living, and aesthetic and recreational opportunities. Further, US 93 is the only primary route through the Bitterroot requiring traffic to use portions of it (especially the north end when commuting to Missoula) whether or not it is congested. Table 4-8 reviews existing average daily traffic and projects traffic levels in 20 years based on the anticipated growth rate and statistical analysis.

TABLE 4-8
EXISTING AND FORECAST TRAFFIC VOLUMES FOR US 93

Segment	Existing ADT	Forecast ADT
North of Hamilton	9,820	14,300
Woodside	9,130	14,850
Victor	6,160	9,630
Stevensville "Y"	6,620	9,710
Florence	7,370	11,260
Lolo	11,240	17,180
Missoula Limits (beyond corridor)	21,170	32,360

4.17 TRANSPORTATION

Information on existing transportation systems, facilities, and conditions was previously presented in Section 3.17. Studies prepared to document potential impacts on transportation facilities and related conditions are the Traffic Study[16] and the Transportation Demand Management Corridor Analysis[17].

The information that follows will discuss impacts on various facets of transportation - related items such as intermodal connections, existing highway conditions, traffic capacity, level of service, safety, traffic reduction measures, pedestrian and bicycle facilities, and transportation planning. To avoid unnecessary duplication, discussion of cumulative impacts and mitigation measures are lumped together into common presentations at the end of this section.

Transportation Modes and Network: All alternatives will allow continued intermodal connection to transportation facilities such as air, rail, bus, pedestrian, bicycle, and highway facilities. The "no action" and "no build" alternatives that do not provide for substantial relief of congestion will adversely affect the efficiency with which intermodal connections can be made. Implementation of the bus and rail alternatives will encourage intermodal use, providing some relief to highway facilities. "Build" alternatives that provide for a reduction of congestion and more efficient traffic flow would facilitate intermodal connection.

US Highway 93 through the corridor is already a vital highway transportation link and all indications are that this importance will increase in the future. The area is growing rapidly (increasing local travel), the national economy is healthy (increasing interstate commerce), and international trade agreements such as NAFTA are in-place (encouraging international travel on major connecting routes such as US 93). Improvements to the highway are needed to preserve and enhance US 93's role as a major transportation link.

The "no action" alternative will be detrimental to this need as it offers no relief to congestion, no improvement in transportation efficiency, and no correction of deficient conditions. "No build" alternatives will each provide important individual links to intermodal transportation, which is a positive benefit. However, they offer very little relief of congestion or opportunity to improve deficient highway conditions which is considered a detrimental impact for the facility's role has a major link in the transportation network.

The "build" alternatives offer the best opportunity to improve US 93's compatibility within the corridor to the rest of the system linkage. Alternatives with additional lanes will substantially improve capacity, traffic flow efficiency, safety, and local access. The 2-lane modified option provides these benefits, but only in those areas where additional lanes are constructed and not throughout the corridor at large.

The alternate alignment alternatives at Silver Bridge and Bass Creek Hill will have no impact with regard to system linkage.

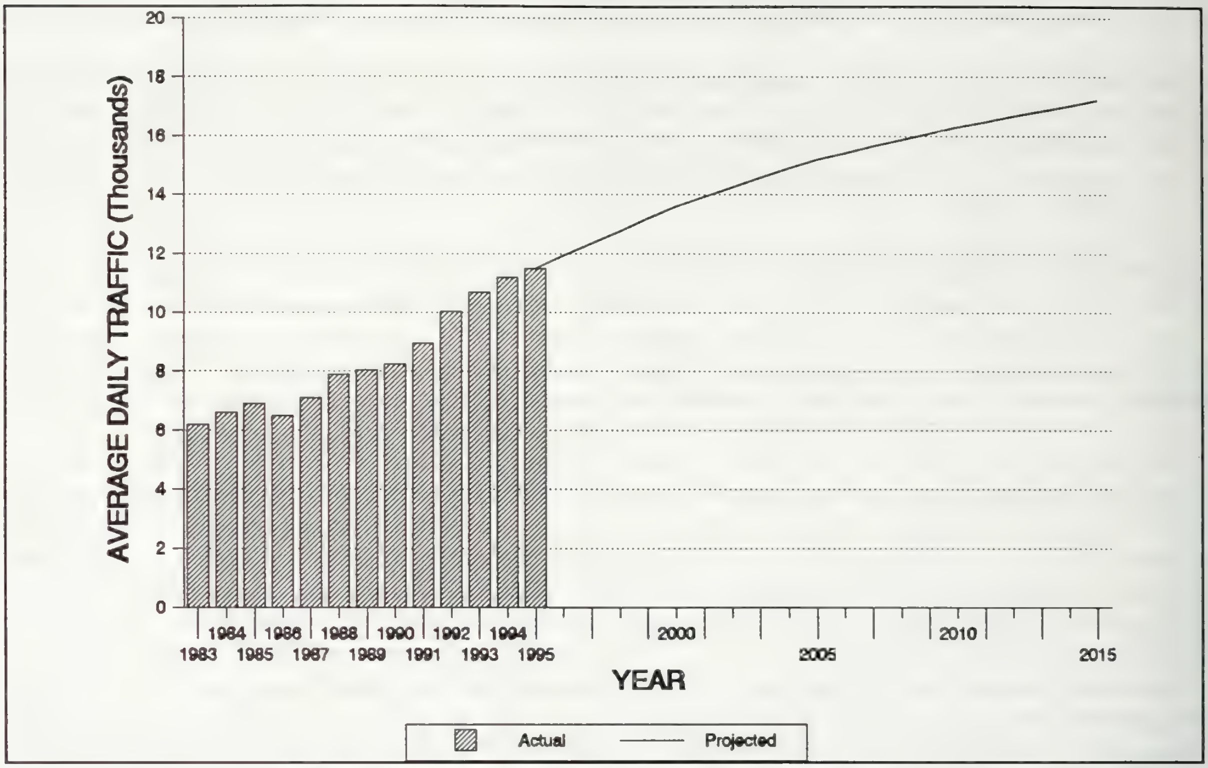
Physical Highway Conditions: Section 3.17 reviewed the condition of the existing highway and set forth several deficiencies in terms of geometry, alignment, and condition. Substandard conditions exist in many locations and existing facilities in other locations are ready for "retirement" -- needing rejuvenation or replacement to properly perform the intended function.

The "no action" and "no build" alternatives offer no relief for these conditions. Only implementation of the "build" alternatives provides the opportunity to physically construct or reconstruct the highway to eliminate narrow widths, steep sideslopes, sharp curves, narrow shoulders, steep grades, deteriorating pavement, etc. The 2-lane alternative offers this only in the areas where it is to be implemented; the other "build" alternatives would provide improvements throughout the project corridor.

The alternate alignments at Silver Bridge and Bass Creek Hill present special opportunities to improve substandard conditions. The new alignment at Silver Bridge allows replacement of a deteriorating bridge structure that has substandard horizontal and vertical clearance. Having given most of its useful life in

Figure 4-6 graphically depicts the anticipated traffic growth rate in the US 93 corridor.

**FIGURE 4-6
PROJECTED TRAFFIC GROWTH**



Growth of traffic volume is expected to occur regardless of whether any improvements are implemented.

The "no action" alternative, which continues existing conditions without improvements, may create some change in traffic patterns. Already close to one-half the travelers using the corridor have indicated changing their time of travel due to "too much traffic" or to "avoid rush hours". Without improvements, increased congestion will become more of a factor in altering travel plans, which in turn may either prolong periods of congestion or altogether create new congestion at other times of the day not currently experiencing this problem. In areas where the Eastside Highway provides an approximate parallel route, it may become more congested as local travelers seek to avoid the difficulty of using US 93.

The "no build" alternatives may produce changes in traffic patterns if they cannot entice enough users to abandon their single-occupant vehicle. To the extent they are successful, they will provide a degree of offset against the expected growth in traffic which may delay, but not likely eliminate, the time when congestion again becomes a serious problem.

The "build" alternatives through providing greater capacity and more efficient service (discussed below), will likely produce more of a status quo in terms of traffic characteristics and periods of peak use.

Realignment alternatives would have little, if any, impact on these considerations.

Capacity: The capacity of a 2-lane highway is considerably limited with increased traffic due to oncoming traffic eliminating the opportunities to pass slower vehicles and the psychological effects of opposing traffic. Adding an additional lane in each direction overcomes these problems and produces a significant increase

in capacity beyond a mere doubling of the 2-lane capacity. National standards[18] for highway capacity indicate the capacity of a multi-lane rural highway as 2000 passenger cars per hour (pchp) per lane. Therefore, the total capacity for 4-lanes is 6600 pcph; a major increase beyond the capacity of a 2-lane facility.

Table 4-9 presents information showing the capacity of various highway segments in the corridor to handle the future demand. The percent of capacity used is shown for both 2-lane (existing) and 4-lane (proposed action) configurations.

TABLE 4-9
EXISTING AND FORECAST CAPACITY AND DEMAND FOR US 93

Segment	Existing DHV	% of Recommended Capacity	Forecast DHV	% of Recommended Capacity	
				2-Lane	4-Lane
North of Hamilton	1,470	123%	2,150	179%	33%
Woodside	1,370	114%	2,230	186%	34%
Victor	920	77%	1,450	121%	22%
Stevensville "Y"	990	83%	1,460	122%	22%
Florence	1,110	92%	1,690	141%	26%
Lolo	1,690	141%	2,580	215%	39%
Missoula Limits	3,180	48% *	4,850	---	73%
* Note: 4-lanes at this location, capacity = 6600 pcph					

As determined from Table 4-9, the "no action" alternative will create substantial adverse impacts on highway capacity into the future. The effect will be to create incredible congestion and prolong periods of peak usage. Primary attendant impacts include increased noise and air pollution from stopping/starting vehicles, and severe access problems for cross traffic turning movements.

The remainder of the "no build" alternatives will provide some improvement over no action, but they are not expected to produce sufficient peak hour traffic reduction (5% max) to overcome the capacity problems (shown in Table 4-9).

The 2-lane modified alternative will provide for needed capacity in areas where the additional lane is constructed. However, capacity problems will remain in the alternating areas where there is no additional lane provided.

The remaining "build" alternatives, including the preferred alternative, all provide for an additional lane in each direction throughout the corridor; therefore eliminating adverse capacity impacts.

The alternate alignment alternatives have no effect on capacity.

Access control is one of the factors used in determining capacity. Greater amounts of access to the highway provide more opportunities for through traffic to be disrupted by entering and exiting vehicles that slow the traffic stream and reduce capacity. Implementation of restricted access control in conjunction with any of the alternatives would slightly improve capacity for the area in which it was implemented. Conversely, permissive

access control policies allow for a greater number and density of approaches, thereby somewhat reducing capacity.

A 2-lane facility experiences an even greater percentage of reduction in capacity with permissive access control since there are very limited opportunities for traffic to avoid the interference of entering or turning vehicles. Multi-lane facilities are not impacted as much since in most cases traffic has the opportunity to change lanes; thereby avoiding the potential interference.

Impacts associated with access to adjacent properties and the ease of making turning movements for entering and leaving properties is related to traffic. Information on this consideration including a discussion of probable impacts was previously presented in Section 4.13.

Traffic flow will also be impacted by construction of any "build" alternatives selected for implementation. Unquestionably construction will produce delays in traffic associated with detours, rough roads, interference from construction vehicles, and other general construction traffic control measures required to safely accommodate traffic during construction. It is anticipated traffic will be maintained on the highway during construction and detours will be reduced to the absolute minimum possible. Detours would likely be made within US 93 right-of-way, but could also utilize existing, parallel sidestreets when they are available. Impacts related to construction are further discussed in Section 4.24.

Level of Service: The demand on available capacity determines the "level of service" (LOS) provided by the highway in that location. Figure 1-4 (Chapter 1) describes various LOS and presents pictures of typical traffic conditions associated with these levels. The ability of the highway to carry the demand in relation to its available capacity results in a performance grade A through F in much the same manner as a student's performance in school is reported.

MDT guidelines[19] recommend highways be designed to be able to perform at LOS B at the end of the 20 year design and planning period. Table 4-10 compares the present LOS with future LOS for each of the alternatives within the major segments of the study corridor. A similar presentation on major intersection capacity was given in Table 1-5.

TABLE 4-10
US 93 LEVEL OF SERVICE BY SEGMENT

Segment	Existing LOS	Future LOS						
		No Action	No Build	2-lane Modified	4-lane Undivided	4-lane Divided	5-lane	Preferred Alternative
Hamilton-Victor	E	E	E	E	A	A	A	A
Victor-Florence	D	E	D	D	A	A	A	A
Florence-Lolo	E	F	E	F	B	B	B	B

Table 4-10 identifies "no action" and 2-lane modified alternatives will severely impact the highway's LOS. The "no build" alternatives do not offer enough traffic reduction to avoid adverse impacts on LOS.

The remaining "build" alternatives, including the preferred alternative, provide substantial benefits in LOS due to their increased capacity (discussed earlier).

The two alternate alignment alternatives have no impact on LOS.

Similar to the capacity discussion in the foregoing section, access control policies also have a slight effect on LOS. Such effects are usually negligible in comparison to the capacity issue; therefore implementation or removal of access controls are unlikely to change the LOS.

Geometry and traffic are the major parameters affecting LOS. Other factors include pavement condition, density of access, frequency of required turning movements, and on-facility parking. The analyses were made assuming no parking, which may not be true in the urban areas. However, in such areas use of the center two-way turning lane could overcome any negative LOS effects associated with the presence of side parallel parking.

The "build" alternatives offer additional benefits to LOS through the use of wider shoulders (included in analysis), auxiliary turning and acceleration/deceleration lanes, and the center two-way turning lane (5-lane configuration) in areas of high demand for access and associated turning movements.

Safety: Public scoping efforts pointed to highway safety and safety-related concerns to be among the top project issues. It is fair to conclude from experience that safety on a given highway decreases as traffic demand approaches capacity (congestion) and as the level of service deteriorates. These conditions are already occurring within the project corridor; thus public reaction and concern for safety is predictable and consistent with previous experience in similar situations.

The "no action" alternative will have the largest adverse impact on safety. Without improvements and as traffic volume and congestion increase, the "no action" alternative will see a corresponding increase in accident potential directly related to the following major conditions:

- lack of safe passing opportunities
- driver frustration from lack of freedom to maneuver
- impaired visibility and "claustrophobic" feelings
- appreciable differentials in vehicle operation speeds resulting from varying degrees and location of congestion
- lack of facilities and no room for safety maneuvers (no additional lanes and no shoulders)
- left turning traffic interrupting through-traffic stream

The "no build" alternatives will offer some reduction in traffic and congestion. However, projections indicate such reduction will not be sufficient to avoid the adverse impacts on safety these alternatives will have similar to the "no action" alternative.

The "build" alternatives offer substantial beneficial impacts by providing an additional lane for passing opportunities, turning lanes and acceleration/deceleration lanes to accommodate turning and entering vehicles, and 2.4 meter (8 ft) shoulders providing recovery area when needed and safe emergency stopping outside the traffic stream. These improvements result in the following benefits:

- reduced driver frustration and lessening of associated risk taking
- reduction of rear-end and angle collisions from left turning movements, either by providing safe haven in turning lanes or by having the additional lane and shoulder to safely maneuver around turning vehicles
- reduction of head-on collisions by providing more shy distance (additional lane) from on-coming traffic

- provision for errant vehicle recovery in shoulder and clear zone areas

- general accident reduction from diminishing the need for frequent lane changing and vehicle maneuvering associated with passing from a single lane

An excellent example of beneficial impacts to safety associated with upgrading a near capacity rural 2-lane highway to multiple lanes is the section on US 93 north of Missoula from Interstate 90 to Evaro. This 9.7 km (6 mi) long section was improved from 2-lanes to 4-lanes with full shoulders. It provides for good comparison due to its proximity to the study corridor and similarity in driver characteristics, traffic volume, weather conditions, terrain, and land use. A study of operational and safety conditions comparing the 5-year "before" (2-lane) and a 5-year "after" (4-lane) situations provides an interesting comparison:

- capacity and level of service substantially improved (was D, now A)

- total number of accidents decreased by 38% (was 93, now 58) even though traffic volume increased by 31% due to area growth

- fatal accidents were reduced (was 3 in a 5-year period, now 0 in a 5-year period)

- number of accidents involving injuries and the number of injuries declined (46 to 13 and 72 to 24, respectively)

- accident severity index decreased (was 1.65, now 1.22), while state-wide average did not change

It is expected similar safety benefits will result in the Hamilton to Lolo study corridor if "build" alternatives incorporating additional lanes are implemented. Additional positive benefits will accrue from proper use of turning lanes and related amenities.

The need to upgrade out-dated and under-capacity suburban and rural highways is commonplace throughout the country where growth is occurring and increased demands are being placed on transportation facilities. In recognition of this need, the Transportation Research Board of the National Research Council prepared an in-depth study evaluating various alternatives to provide improvements to such 2-lane facilities where warrants exist. Their Report #282 - *"Multi-Lane Design Alternatives for Improving Suburban Highways"* [20] (TRB Report) is considered by transportation professionals to be the standard for evaluating alternatives and developing recommendations for improvements to these facilities.

The TRB Report is based on nationwide experience and incorporates numerous studies and research conducted throughout the country on the common issue of providing improved operation (capacity and level of service) and safety (accident frequency, severity, and type) for out-dated and inefficient 2-lane highways. Existing conditions on the 2-lane facility within the project corridor are such that the TRB Report has specific application to this study. The information that follows is taken from the TRB Report to help better visualize the advantages and disadvantages of the various "build" alternatives. Operational considerations have largely been covered in the foregoing subsections; the emphasis hereafter will be first on advantages and disadvantages, and secondly on safety issues.

The modified 2-lane design alternative (occasional additional lane for passing on 2-lane highway) offers improved traffic operational and safety advantages over a 2-lane undivided highway ("no action"). Unfortunately, this holds true only in areas where the additional lane is implemented. The facility takes on the characteristics and impacts of the "no action" alternative in all areas where additional lanes are not provided. Where implemented, it requires only minimal increase in roadway width over other alternatives and can be expected to reduce accident rates by 10 to 20 percent (with inclusion of full shoulder) over the "no action" alternative. One particular disadvantage is an actual increase in accident rate in the transitional areas

at the beginning and end of the additional lane segments as drivers jockey for position or make high speed, unsafe attempts to pass the last vehicle just before the additional lane is dropped.

The 4-lane undivided design alternative is most appropriate for residential and light commercial areas without high left turn demands on suburban highways classified as collectors and minor arterials. The 4-lane divided and 5-lane design alternatives, if physically feasible, would be more desirable than the 4-lane undivided on highways that have dense commercial development, have heavy left turn volumes, or are classified as (or could become) major arterials. As will be seen, the 4-lane undivided offers a reduction in accidents in rural areas as compared to a 2-lane undivided facility, but will likely see more accidents if utilized in commercial areas with high access demand and appreciable turning movements.

The 4-lane divided design alternative is best suited for use on major arterials with high volumes of through-traffic and less than 28 driveways per km (45 per mile). This alternative is operationally preferable over the 4-lane undivided alternative only for sites with peak hour flowrates over 1,000 vehicles per hour in one direction. The average accident rates for the 4-lane undivided and 4-lane divided design alternatives are approximately the same. The 4-lane divided design alternative is not well suited to highways with strip commercial development because the median serves as a barrier to cross traffic and left turn movements which greatly restrict access.

The 5-lane design alternative is most appropriate for suburban highways with commercial development, driveway densities greater than 28 driveways per km (45 per mile), low to moderate volumes of through-traffic, high left turn volumes, and/or high rates of rear-end and angle accidents associated with left turn maneuvers. This alternative was found to be operationally superior to the 4-lane undivided and divided alternatives for all conditions in these types of areas (commercial). Implementation of the 5-lane design alternative is expected to reduce accident rates by 19 to 35 percent on the average with even greater reductions possible in highly congested areas. This alternative has been used extensively in the past two decades in Montana and the rest of the country and is likely to continue as the most common multi-lane design alternative improvement for suburban highways.

Table 4-11 reviews the operational and safety advantages and disadvantages of the "build" alternatives. For discussion purposes, the 2-lane undivided alternative is the "no action" alternative and the "no build" alternatives since they would be similar to it with regard to operational and safety characteristics. The 2-lane modified will have the characteristics of the 2-lane undivided where the additional lane is not provided and those of the 4-lane undivided where it is.

TABLE 4-11
OPERATIONAL AND SAFETY ADVANTAGES AND DISADVANTAGES OF ALTERNATIVES

Alternative	Advantages	Disadvantages
2-lane Undivided ("No Action" and "No Build")	• least expensive alternative • minimal right-of-way required	• minimal capacity for through-traffic • delays caused by left turning vehicles • congestion remains
2-lane Modified	• low cost • some localized improvement • minimal right-of-way required	• congestion remains in unimproved segments • restricted capacity in unimproved segments • higher accident rate in transitional areas
4-lane Undivided	• provides additional lanes to increase capacity • moderate cost, width, and right-of-way requirements	• delays caused by left turning vehicles (without turning lane) • may generate safety problems associated with rear-end and lane changing conflicts • difficult access in commercial areas • some difficulty for pedestrian crossing

4-lane Divided	• provides additional lanes to increase capacity • reduces rear-end and angle accidents associated with left turns • provides physical separation to reduce head-on accidents • discourages strip commercial development • provides a median refuge area for pedestrians	• greatest cost, width, and right-of-way requirements • increased delay for left turning vehicles • indirect routing required for large trucks • lack of operational flexibility due to fixed median • restricted access to adjacent properties
5-lane	• provides additional lanes to increase capacity • reduces delay caused by left turning vehicles • reduces frequency of rear-end and angle accidents associated with left turn maneuvers • provides spacial separation between opposing lanes to reduce head-on accidents • increases operational flexibility • facilitates access to adjacent properties	• considerable cost, width, and right-of-way required • no refuge area in median for pedestrians • may generate safety problems at closely spaced driveways and at intersections • may encourage strip commercial development
Preferred Alternative	• provides additional lanes to increase capacity • moderate cost, width, and right-of-way requirements • reduces delay in urban areas caused by left turning vehicles and reduces associated frequency of rear-end and angle accidents • increases operational flexibility • facilitates access to adjacent properties in urban areas and protects undeveloped properties from excessive access in rural areas	• delays caused by left turning vehicles (without turning lane) • may generate safety problems associated with rear-end and lane changing conflicts (4-lane areas) • some difficulty for pedestrian crossing (no refuge area) • may generate safety problems at closely spaced driveways and at intersections (5-lane areas)

The TRB Report also discusses safety considerations in detail for each of the alternatives. Safety effectiveness for a given alternative can be assessed by before and after studies of actual improved areas and also comparative evaluations between alternatives in separate areas but with similar traffic volumes, characteristics, and land use. Both methods were extensively employed in the TRB Report to develop the generalizations reported here.

Obviously, safety conditions in the corridor will vary according to traffic volume, adjacent land use, density of access, terrain, and other similar factors. For simplicity of discussion, an average "typical" section of highway has been selected for the purpose of reviewing safety characteristics associated with the alternatives. Sections of highway with more or less traffic would likely see a proportional change in safety impacts. Although the statistics that follow are based on the nation-wide study, it is expected that the conditions in Montana are similar and specific State statistics would yield proportionately similar results.

The first safety benefit is with regard to providing full shoulders for any given alternative. Records indicate an accident reduction of approximately 10% for a highway with a full shoulder over a similar highway with no shoulder. For this reason and the fact that US 93 has been included in the *National Highway System*, full shoulders are recommended for any improvements implemented.

Next is a discussion on accident rates. Using the average typical highway section with a future traffic of 10,000 vehicles/day, 5% trucks, and full shoulders, Table 4-12 compares the expected annual accident rates per kilometer (mile) for the various alternatives in both commercial and residential areas. In commercial areas the driveway density was taken at 18.6 to 37.3 per km (30 to 60 per mile) and density in the residential areas was assumed to be under 18.6 per km (30 per mile). Intersection frequency was taken at 3.1 to 6.2 per km (5 to 10 per mile) and under 3.1 km per km (5 per mile), respectively.

TABLE 4-12
PROJECTED ACCIDENT RATE POTENTIAL

Type of Development	Number of Accidents per Year per kilometer (mile)					
	No Action and No Build	2-lane Modified	4-lane Undivided	4-lane Divided	5-lane	Preferred Alternative
Residential	7.6 (12.3)	6.5 (10.4)	5.3 (8.5)	5.5 (8.8)	3.7 (5.9)	4.6 (7.4)
Commercial	10.9 (17.6)	13.8 (22.2)	16.7 (26.8)	16.6 (26.7)	12.7 (20.5)	15.0 (24.1)

Table 4-12 indicates a reduction in accident potential for alternatives offering additional lanes in rural residential areas. However, an increase in accident potential over the "no action" alternative occurs in commercial areas, primarily from higher accident rates expected for unsignalized intersections. This analysis suggests the "build" alternatives having the least impact on safety are the 4-lane undivided in rural sections and the 5-lane alternative in areas of commercial development. This matches the recommendations of the preferred alternative.

It also matches a separate analysis made of accident frequency with respect to location in the corridor. A plot was made graphing the total number of accidents occurring a three year study period between each mile post in the corridor. As expected, the graphs showed nearly double the amount of accidents occurring in areas of present development where a high degree of access and corresponding turning movements are required. Overlaying the recommendations for lane configuration of the preferred alternative shows excellent correlation for the use of the 5-lane alternative in areas of commercial development (frequent accident occurrence) and the use of the 4-lane undivided alternative in rural sections (minor to moderate accident frequency).

The higher rates expected for unsignalized intersections suggested a closer look be taken at major intersecting roadways in the corridor. Accordingly, warrant studies were conducted (1995) which indicate that signal warrants are met for the intersection of US 93 with Woodside Crossing in Woodside and also the intersection with the Eastside Highway in Florence. Based on these warrants it is recommended to include signals at these intersections as a part of the proposed action. Future re-analysis of signalization warrants at other major intersections in the corridor is recommended to be conducted on a regular basis to keep functionally-challenged intersections from increasing the accident rate potential.

The safety analysis in the TRB Report also quantifies the differences in accident severity distribution between design alternatives. Table 4-13 presents the percentage of accidents involving a fatality or injury by alternative, adjacent land use, and accident location (non-intersection and unsignalized intersections).

TABLE 4-13 PROJECTED ACCIDENT SEVERITY						
Location / Land Use	**Percent of Accidents Having Fatality or Injury**					
	No Action and No Build	**2-lane Modified**	**4-lane Undivided**	**4-lane Divided**	**5-lane**	**Preferred Alternative**
Non-intersection						
Residential	43.6	41.2	38.8	43.6	38.8	38.8
Commercial	38.4	38.4	38.4	33.7	33.7	36.4
Unsignalized Intersection						
Residential	32.9	32.9	32.9	45.1	26.2	30.1
Commercial	39.0	35.6	32.1	26.9	32.1	32.1

Out on the highway (away from intersections) the accident severity rates for "build" alternatives are equal to or less than those associated with "no action". The same holds true at unsignalized intersections with the notable exception of the 4-lane divided highway in rural areas. This is likely due to higher operational speeds at these locations coupled with a lack of anticipation for cross traffic on the part of mainline vehicles.

Values shown in Table 4-13 for the 2-lane modified alternative, which is not specifically treated in the TRB Report, were obtained by averaging the values for "no action" and the 4-lane undivided since this alternative is really either one depending on whether or not the additional lane is present. Also, the "no build" alternatives are expected to be similar to the "no action" alternative listed in the table since the physical characteristics of the roadway would be the same.

Selection of alternate alignments (Silver Bridge and Bass Creek Hill) have essentially no impact with regard to the foregoing operation and safety discussions.

The preferred alternative, which is a combination of 4-lane undivided in rural areas and 5-lane facility in areas of commercial development, was evaluated by pro-rating values for 4-lane undivided and 5-lane in proportion to the total length of each recommended for the project. Based on the foregoing discussion with regard to operation and safety, recommended elements of the preferred alternative maximize benefits and reduce adverse safety impacts to the best possible extent for the areas in which they are proposed as compared to other alternatives.

Finally is a discussion of animal collisions with regard to safety. Information presented in Chapter 1 and Section 3.17 indicated the vast extent of the current problem and the enormous annual property damages that result. The Deer Kill Study[10] conducted in response to this problem examined alternative management tools for reducing the scope of the problem. It concludes the deer kill potential will continue as game populations and traffic volumes increase and as human development encroachment related to increased growth concentrates the deer population into smaller areas of habitat. Analysis of impacts of the alternatives on wildlife and the deer kill issue presented in Section 4.17 were inconclusive as to recommending implementation of a given alternative and suggested that proper mitigation procedures would offer the best opportunities at problem minimization.

The following generalizations from the deer kill report present mitigation measures that are recommended for implementation to the extent practicable along with any other proposed actions to decrease the accident rate potential associated with wildlife collision:

- In general, narrower pavements (fewer lanes) can be a benefit in reducing the potential for mortality for many forms of wildlife. Alternately, wider shoulders and additional travel lanes do provide a greater opportunity to safely avoid animal collisions.

- Dividing structures such as jersey barrier or continuous guardrail should not be used. Painted dividers or narrow medians lacking vertical structure are preferable.

- Wider rights-of-way and clear zones void of vegetation increase overall traffic safety but result in wildlife habitat loss. It is recommended that MDT consider the development of right-of-way management plans formulating management practices to balance the need for safety against the potential loss of a resource under encroachment.

  The plan should also incorporate vegetation management within the right-of-way and clear zones to eliminate vegetation attractive to wildlife species (especially deer) and replace it with less palatable species.

- Consideration should be given to changing deicing operations to substitute for or reduce the amount of salt, which is an attractant to deer in the clear zones and along the edges of the roadway.

- A continuation of promptly removing roadkill is considered sound management. This reduces the risk of additional mortality to other scavengers, both wild and domestic.

- Exclusionary right-of-way fencing, constructed animal crossings, signing and nighttime speed reductions, deer whistles, and game management manipulation hold little, if any, promise for this area. However, equalizing culverts for passage of smaller animals is recommended for any highway-bisected wetlands or habitat areas.

  Management tools with more promise include highway illumination, Wolfin chemical repellent, and Swareflex reflectors. Unfortunately, the pervasive nature of the deer kill problem throughout the corridor raises questions over cost versus benefit for implementing these measures. It is recommended to conduct feasibility tests in limited areas to determine and identify the more promising solutions.

- Development and implementation of a driver awareness public education program is recommended. The bottom line is better training in defensive driving. Training on knowing what to look for, what and what not to do in the event of an imminent collision, and also what to do or avoid after a collision are all important factors. Critical danger warning signs on the highway and perhaps inserts or markings on State tourism maps delineating critical deer kill areas could help.

- The more that is understood about the deer kill problem, the greater the possibility of implementing reduction measures. It is recommended to continue keeping deer kill statistics, coordinating with wildlife management personnel, and developing "partnering" relationships among agencies and the public to provide both the mechanisms and funding for continued research and trial implementation of potential reduction measures.

Pedestrian and Bicycle Facilities: Section 3.17 discussed existing bicycle facilities and the public's attitude and desires in this regard. It is recommended to include pedestrian and bicycle facilities with any proposed actions that are implemented.

The "no action" alternative and the "no build" alternatives would not provide for improvement of pedestrian or bicycle facilities or improve the unsafe conditions for these presently existing on the highway. It is envisioned that the alternatives for park-and-ride, and perhaps rail service, would have the terminals connected by sidewalk to the populated areas and that provision for accommodation of bicycles including parking racks and dedicated bike paths would be a part of any implementation of these alternatives.

Pedestrian and bicycle usage would likely increase with the "no build" alternatives if access to carpooling, bus, and rail systems are reasonably close to populated areas.

All of the "build" alternatives offer the opportunity to improve pedestrian and bicycle facilities. All would incorporate use of the 2.4 m (8 ft) shoulders on the highway. These would be paved to provide a smooth riding surface and the shoulders would be carried across bridge structures. The shoulder width is twice the minimum recommended width in the AASHTO standards for bicycle facilities.

In areas of the project anticipating higher bicycle usage (i.e. Hamilton to Woodside, near Victor and Florence, and in the corridor from Florence to Lolo), investigation should be made for constructing a separate bike path to accommodate the higher anticipated usage. This would be a facility off the shoulder of the road, perhaps at the toe of slope, that would provide for 2-way pedestrian and bicycle traffic, meet bicycle path standards, and be appropriately signed for such usage.

In urban areas of the project and near other concentrations of residential or commercial development, the "build" alternatives would incorporate a typical section with curb, gutter, and 1.5 m (5 ft) minimum concrete sidewalks.

The alternate alignments would not have an impact on pedestrian and bicycle facilities other than incorporation of the full shoulder and carrying the shoulder width across the bridge for pedestrian and bicycle activities. It may be possible to construct the recommended new bridge with a separate pedestrian/bicycle lane separated by a concrete barrier from traffic.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) emphasizes the need for economically efficient and environmentally sound alternate modes of transportation. Accommodation of pedestrian and bicycle facilities fits well into the goals and objectives of the Act and it is recommended that potential funding sources for improved and separated pedestrian/bicycle facilities be actively investigated. Potential sources of funds include funds from the following sources:

- national highway system funds
- surface transportation program funds
- congestion mitigation and air quality program funds
- federal lands and highway funds
- scenic bi-way funds
- national recreation trail funds

ISTEA encourages the development of bicycle transportation facilities, which are defined as new or improved lands, paths, or shoulders for use by bicyclists. The program calls for proper implementation of traffic control devices, shelters, and parking facilities for bicyclists. It is recommended to investigate the proper combination and implementation of these types of facilities along with the proposed action to make improvements as pedestrian and bicycle friendly as possible.

Transportation Plans: Both the Missoula County and the proposed Ravalli County Comprehensive plans recognize the function of US 93 locally as the primary arterial in the corridor. These plans call for a continuance of this function and making such improvements as are necessary to preserve the important function that the highway serves in terms of access, commuting, and commerce. Similar concepts have been set forth in area economic development plans such as the Bitterroot Futures Study.

The "no action" alternative will not meet the goals and objectives of the transportation plans, since without improvements the congestion will increase and the function and efficiency of the existing highway will correspondingly decrease. However, usage of the highway will not likely diminish as there are no alternate routes to take in most locations within the corridor. If there were, the effect of "no action" would cause traffic to use those facilities; thus abandoning US as the primary arterial, which would be counter to the goals and

objectives of these planning documents. For example, the Eastside Highway which parallels US 93 in a portion of the corridor is already experiencing some pressure from increased traffic as motorists try to avoid the congestion already present on US 93 during periods of peak usage.

Implementation of the "no build" alternatives would be somewhat consistent with the plans in that they offer alternative modes of transportation, provide some degree of reduction of congestion, and minor improvement of capacity on US 93. The planning documents have not come forward to recommend a specific alternative, but do encourage these alternatives and other TDM measures in general. However, the congestion relief will not be sufficient to avoid adversely impacting the function of the arterial.

Implementation of any of the "build" alternatives will provide significant improvements to US 93 in helping it to function as the primary arterial through the area. Those alternatives that provide greater capacity and smoother traffic flow (by additional lanes) best meet the stated goals and intentions for this facility as set forth in the transportation planning documents.

The documents also call for control of growth and preservation of land use. Implementation of the access control alternatives previously reviewed in this document along with local county efforts for planning and controlling land use will do much to help realize the goal of controlled growth. It also assists with the objective to densify existing development while protecting undeveloped and vacant land from further encroachment and developmental pressure. The consideration of improved pedestrian and bicycle facilities, as discussed in the section above, is also consistent with goals and objectives of local transportation plans.

The alternate alignments are not specifically addressed in transportation planning documents, but to the degree they allow for improved capacity, smoother traffic flow, and less environmental impact they would be consistent with and support desired conditions set forth in the planning documents.

The preferred alternative has been carefully developed to be consistent with and support land use planning policies and transportation objectives of the local plans. It calls for implementation of pedestrian and bicycle facilities, park-and-ride lots, and other such feasible and economical measures to provide alternative forms of transportation and reduce traffic on the highway as are practicable. Roadway width and access will be a minimum in rural areas to protect land use and preserve the function of the highway as an arterial. A 5-lane section facilitating access to business and commerce will be employed in commercial and "urban" areas to encourage further development and densification in these areas where public services are already provided.

Indirect, Secondary, or Cumulative Impacts: Improvements to US 93 in the study corridor are consistent with other constructed or planned improvements to US 93 in western Montana. The overall cumulative impact is one of improving transportation facilities to provide for the needs and demands placed on them by growth and economic development of the region. Improvement in level of service, a reduction of accidents and other safety concerns, opportunities for transportation demand management, and incorporation of pedestrian and bicycle facilities all serve to combine with and strengthen other similar efforts being made for transportation facilities in western Montana.

Previous impact sections have clearly established that growth of the area is occurring in response to many factors other than transportation availability and efficiency. Cumulative impacts to transportation are a natural consequence of such growth, which often leads to increased pressure, congestion, and stress on already outdated and inadequate transportation facilities. The "no action" alternative would add to these cumulative effects, whereas, the "no build" alternatives (to the extent they can reduce traffic) and the "build" alternatives are considered as beneficial cumulative impacts to the regional transportation system as a whole.

Another cumulative impact may be a slight increase in interstate and truck traffic using the road from improvements to other sections, inclusion of US 93 in the National Highway System, and recent passage of the NAFTA agreement.

Mitigation: Various mitigation items are available to assist in reducing impacts to transportation improvements by implementation of the proposed action. The following is a list of mitigation items related to the discussions of this section on transportation systems, organized according to topic:

Transportation Modes

- Continue efforts at public eduction and awareness to encourage the use of alternative modes of transportation.
- Assure continued access and as little restriction to travel as possible during construction to reduce interference with intermodal connections.

Physical Highway Conditions

- Continue to maintain present highway facilities, correcting deficiencies, and providing preventative maintenance to prolong the life of existing facilities until such time as more permanent improvements can be made.
- Provide proper enforcement for highway load limits, vehicle configuration, and restricted speeds (seasonally as necessary) to protect against further pavement deterioration and destruction to the extent possible.
- Perform regular inspections of transportation facilities to discover and address problems before they create major adverse impacts.

Traffic, Capacity, and Level of Service

- Provide traffic control measures where necessary to properly control traffic and pedestrian movements. Investigate critical areas for warrants for signage or signalization in accordance with the manual on *Uniform Traffic Control Devices*. Implement only those traffic control measures that are warranted to avoid creating further problems.
- Encourage new development to access local streets first and consolidate local streets into the minimum number of access possible on US 93.
- Encourage local travelers to utilize local roads as much as possible to help relieve congestion on the main highway.
- Implement access control, particularly in rural areas, to reduce the number of accesses; thereby improving traffic flow.
- Provide for intersection improvements including appropriate geometry, additional lanes, appropriate sight distance, turning radii to accommodate large trucks, and other similar design items to improve the efficiency and capacity of intersections.
- Provide adequate signage and pavement markings to properly guide and direct motorists and keep the traffic flowing in an efficient manner.
- Develop parking on side streets, discouraging parking on the main highway to improve capacity.

Safety

- Provide appropriate signage, warning of inherent dangers, particularly addressing the high potential for animal collisions in the corridor.
- Enforce the posted limits, both for maximums and for slow drivers as well.

- Conduct public education and awareness campaigns to educate the public about proper use of turning lanes, traffic control devices, and other facilities provided to improve safety on the highway.

- Separate pedestrian and bicycle facilities from the roadway to the extent possible.

Access

- Sign for "Right Turn Only" onto the highway from side streets at minor intersections.

- Use access control where appropriate to encourage or discourage access.

- Consolidate access points to the extent possible.

- Encourage businesses to access cross streets or the next street parallel to the highway for their business deliveries and also for customers, if possible.

- Provide turning lane facilities (both left and right) where warranted to accommodate areas with a higher need for access.

Transportation Demand Management

- Continue efforts to establish a transportation management association by providing leadership and start-up funding.

- Conduct a considerable public education campaign to make the general public aware of the need for and the positive benefits of traffic reduction techniques.

- Provide employer incentives in terms of preferred parking, extra compensation, special perks, or other similar measures for those willing to carpool or utilize alternative modes of transportation.

- Develop individual and collective willingness to sacrifice for the greater public good through supporting and utilizing TDM activities to reduce traffic and congestion on the highway.

Pedestrian and Bicycle Facilities

- Provide for improved pedestrian/bicycle facilities whenever possible and separate them from the highway when feasible. Conduct public education campaigns increasing the awareness of the opportunity to utilize pedestrian and bicycle facilities as alternative modes of transportation.

- Provide bicycle friendly facilities at businesses, recreational centers, and public facilities to facilitate and encourage pedestrian/bicycle use.

Transportation Plans

- Continue planning efforts to control growth and protect the efficiency and function of major transportation systems in the area.

- Provide public involvement opportunities to discuss transportation systems and improvements.

- Encourage new development to access local streets wherever possible and to incorporate TDM provisions in the design to make these developments more conducive to alternative forms of transportation.

4.18 HISTORIC RESOURCES

Historical background information and a description of the Historical Resources Inventory[21] were presented in Section 3.18. The study identified six sites as having historical resources either already listed or eligible for inclusion on the *National Register of Historical Places (NRHP).*

Coordination with State Historic Preservation Office (SHPO): The SHPO was invited to participate in project planning as member of the Interdisciplinary Team. Time and budget constraints precluded SHPO from actively participating on the ID Team, but coordination and consultation was achieved by letter correspondence between MDT and the SHPO. A copy of the Cultural Resource Inventory Report for the project corridor was also sent to SHPO.

SHPO responded directly to MDT with its determinations. An initial response[22] concurred that two sites and four features (sub-elements of sites) were eligible for listing in the NRHP. Later concurrences[23,24] determined findings of either no effect, no adverse effect, or no need for a Determination of Effect for all historic properties. These results are reviewed for each property in the "Remarks" section of Table 4-15.

Definition of Impacts: Potential adverse impacts to properties eligible or recorded on the *National Register of Historical Places* (NRHP) could occur under any of the following non-exclusive conditions:

- destruction of all or a portion of a given property
  - acquisition of ground or right-of-way
  - ground disturbance of property for construction activities
  - destruction and/or removal of associated resources including building structures and landscaping elements
  - modification for alteration of buildings or other improvements on the property
- isolation from or alteration of the property's surrounding environment
- introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting
- neglect of a property resulting in deterioration or destruction
- transfer or sale of a property without adequate conditions or restriction for preservation, maintenance, or use

Specific Impacts: Each of the properties eligible for listing have been carefully studied and examined for potential impacts relative to the above stated criteria. Fortunately, all properties and their associated historical elements are outside the existing right-of-way and very little, if any, additional right-of-way will be required for any alternatives at these locations. Therefore, destruction or alteration of the ground or improvements on the property will not occur. Similarly, minimizing construction impacts at these locations will avoid altering or isolating the property's surrounding environment.

Engineering design of the alignment generally maintains the prevailing grade and existing horizontal alignment. In the case of three properties, the alignment is actually pulled away from the historical property. Maintaining alignment and grade also minimizes the opportunity for adverse visual impact. In some cases traffic may be slightly closer to the properties for those "build" alternatives adding an additional lane. This effect is considered negligible since the additional lane can be constructed within existing right-of-way and no disturbance of any historic property is required.

Audible and atmospheric impacts may be associated with traffic and congestion. For the "no action" alternative traffic congestion and reduced speeds will likely result in greater noise and air pollution. Conversely, those alternatives reducing traffic or providing for smoother flow by increased capacity will tend to lower traffic noise and air pollution.

Impacts associated with neglect of the property, sale, lack of preservation or maintenance, etc., are issues wholly determined by the private owners of these properties; therefore these issues are totally independent of transportation improvement alternatives.

Specifically, the preferred alternative incorporates conducive line and grade past these properties, the narrowest section possible (with regard to existing and proposed land use conditions), and is designed to eliminate the need for additional right-of-way and reduce construction impacts as it passes these properties. The realignment in the Bass Creek Hill area assists in avoiding impacts by pulling the new alignment away from two of the eligible historic properties.

Table 4-15 is a listing of the eligible or listed properties and a brief discussion regarding relation of proposed improvements to the existing property where appropriate. SHPO comments are given at the end of each entry in the "remarks" column.

TABLE 4-14
RELATION OF TRANSPORTATION IMPROVEMENTS TO HISTORIC PROPERTIES

Site Number	Property Type	Remarks
RAVALLI COUNTY		
RA459 mp 51.8	brick residence	Only the brick residence of this lumber yard complex is considered potentially eligible for listing. The brick building is currently 34 m (112 ft) from centerline. The distance from existing right-of-way to the building is 21 m (69 ft). Approximately 3 m (10 ft) of additional right-of-way will be required to properly construct the road. The area between the existing fence and building is vacant ground, non-landscaped, and non-contributory to the character of the residence. Acquisition of the additional needed right-of-way and construction of a minor cutslope within it should have minimal impact on this property. SHPO: Feature eligible but site as a whole is not. No adverse effect. Approximately 180 m (590 ft) south of this location the lumber yard store and storage area will need to be acquired/relocated. Although this is part of the same complex, the complex itself is not deemed eligible for listing and neither is the building. Therefore, it will not constitute an adverse impact on a historic property.
RA460 mp 68.7	vernacular dwelling	This structure is located well off the right-of-way and no new right-of-way is required. Additionally, the centerline of the proposed alignment begins at this point to pull westward away from the property further reducing the potential for impact. No adverse impacts are anticipated. SHPO: Feature eligible, but site as a whole is not. No effect.
RA271 mp 71.8-76.9	Bitterroot Railroad	The railroad parallels the highway in this area. The existing right-of-way will be used and no additional right-of-way is required. Wherever possible and necessary, the proposed alignment has been shifted slightly westward in order to further avoid the need for encroachment on railroad right-of-way. No adverse impacts anticipated. SHPO: Eligible for listing. No effect.
MISSOULA COUNTY		
MO359 mp 76.9-82.1	Bitterroot Railroad	The railroad parallels the highway in this area. The existing right-of-way will be used and no additional right-of-way is required. Wherever possible and necessary, the proposed alignment has been shifted slightly westward in order to further avoid the need for encroachment on railroad right-of-way. No adverse impacts anticipated. SHPO: Eligible for listing. No effect.

MO357 mp 81.9	historic homestead	The entire complex is outside the existing right-of-way at this location and no new right-of-way is required. No adverse impacts are anticipated. SHPO: Eligible for listing. No adverse effect.
MO176 mp 82.8	Travelers Rest	This listed site is in actuality a large area surrounding the confluence of Lolo Creek with the Bitterroot River. The area itself is approximately ½ mile east of the existing corridor; therefore no adverse impacts will occur. SHPO: Already listed. No effect. However, it is recommended to maintain historical signage and monumentation in the area commemorating the significance of this location. Additionally, a pull-out in conjunction with an interpretive sign should also be perpetuated to provide travelers the opportunity to learn of and appreciate the historical significance of the nearby site.

The SHPO concurrences that the properties will experience no effect or no adverse effect means that the Section 106 - Historic Preservation Requirements are met for any proposed improvements described within this environmental document. However, if the proposed alignment is changed for any reason in the vicinity of these properties, then potential impacts will need to be evaluated which may require a change in the determination of effect.

Indirect, Secondary, or Cumulative Impacts: Once again, projected growth and growth patterns and projections in the area constitute a potential impact to historical properties. This growth is expected to occur regardless of the implementation of transportation improvement alternatives. The growth will provide pressure for subdividing agricultural and vacant lands, have the potential to destroy unknown historical resources, and overrun those that are known and eligible. Further, it could cause isolation from the surrounding environment and introduce visual, audible, and atmospheric elements that are out of character with the property or alternate setting. Additionally, the tendency of some historic property owners to neglect the property and structures can negatively impact historic resources by diminishing the historic value.

Mitigation: The following are recommended mitigation practices to preserve historic resources:

- Design to avoid historic properties altogether wherever possible. If not, design to minimize impacts to the greatest extent possible by carefully examining line and grade, steepening sideslopes and utilizing the narrowest section possible while still meeting the stated purposes and needs for improvements.

- Continue close coordination with the State Historic Preservation Office during any design efforts to assure no changes that may adversely affect eligible properties. If a given property is deemed eligible and if there are potential impacts, a memorandum of agreement will need to be established between MDT and SHPO to reduce impacts and otherwise design for acceptable historic preservation of the property.

- Immediately halt construction and consult with authorities responsible for historic preservation if historic resources or potential resources are encountered or discovered during construction.

- Perpetuate signing of historically significant sites and consider creation of signing for those deemed eligible by SHPO.

- Perpetuate or construct pull-outs at significant historical sites (i.e. Travelers Rest) to enhance appreciation and understanding of the historic resources.

4.19 CULTURAL RESOURCES

A review of existing cultural resources and their background information was presented in Section 3.19. The Cultural Resources Inventory Report[21] cited in the previous section also contained information regarding cultural resources. Specific information on the location of the cultural resource sites is available through MDT.

Coordination with Tribal Groups: Consultation with tribal groups on cultural resources was made at the outset of the cultural resources inventory study. Unfortunately, circumstances precluded representatives being present during the field investigation. Further consultation through MDT's Environmental Services is on-going.

Coordination with State Historic Preservation Office (SHPO): MDT has coordinated with SHPO concerning cultural resources discovered. After a preliminary alignment was established and refined, the six rock cairn sites were evaluated for potential impacts. Sites 24RA444, 24RA445, and 24RA446 are located well outside the proposed construction limits since the centerline has realigned away from them. However, the centerline would be shifted toward sites 24RA443, 24RA447, and 24RA453. Although they would be located within the proposed right-of-way, the cairns are not situated within the proposed construction limits. To assure protection of these resources, a special contract provision is recommended to restrict activity in the vicinity of these three sites to the designated construction limits. SHPO has given concurrence[23] for this approach.

Specific Impacts: The "no action" and "no build" alternatives will have little if any impact on cultural resource sites.

The separation of the sites from the existing roadway is such that the "build" alternatives would avoid impacts on the sites from construction activities or right-of-way acquisition. Possible exceptions may be the final location of the 4-lane divided highway (with its wider area of disturbance and right-of-way) or any potential final design alignment shifts that may occur to avoid wetlands, hazardous materials, geotechnical concerns, or other similar circumstances.

Alternatives with additional lanes will place traffic closer to the resources, but such effect is considered to be negligible. Implementation of the preferred alternative is not anticipated to produce adverse impacts on cultural resources. However, some sites are close enough to the existing highway that careful engineering design and further investigation during final design efforts to assure protection and preservation of the cultural resources should be implemented.

Indirect, Secondary, or Cumulative Impacts: Potential cumulative impacts to cultural resources parallel those described for historic resources listed in the previous section. Additionally, specific knowledge of the nature and location of cultural resource sites released to the general public can lead to disturbance or vandalism of the areas resulting from efforts to capitalize on the potential monetary value of possible artifacts or, most unfortunately, from feelings of prejudice on the part of a very few individuals against minority groups associated with the resources.

Mitigation: The following mitigation techniques are recommended for consideration in preserving known and unknown cultural resources:

- Further consultation and coordination with the cultural committees of tribal groups associated or potentially associated with these cultural resources is essential.
- Further investigation of the resources themselves is recommended (if agreed to by the cultural committees) to demonstrate the presence or absence of material that can be used to address pertinent

archaeological research and demonstrate the potential for the site(s) to be placed within a meaningful temporal or cultural context.

- Further coordination with SHPO on the eligibility and measures to protect or mitigate these sites is also recommended.

- Engineering design of recommended improvements should look first at avoidance of the sites altogether and then at reduction of potential impacts through alignment shifts, steepening of slopes, use of narrowest possible section, etc.

- If cultural resources known or unknown are disturbed or encountered during construction, work should be halted and consultation with tribal cultural committees and cultural resource experts should begin immediately.

4.20 RECREATION

Recreational opportunities existing within the study corridor were presented in Section 3.20. Recreational opportunities and facilities are an important part of the human environment, both from a social standpoint and also in terms of community character, cohesion, and quality of life. To the maximum extent possible, efforts will be made to perpetuate (and enhance where possible) recreational facilities within the project corridor.

Specific Impacts: Fortunately there will be no direct adverse impacts to public recreational facilities; therefore a detailed Section 4(f) Evaluation is not required. In all cases, the existing facilities can be perpetuated and the recreational functions will continue uninhibited. Table 4-16 reviews anticipated impacts to recreational facilities.

TABLE 4-15
RECREATIONAL IMPACTS

Milepost	LT or RT	Public	Private	Potential Impact
FISHING / BOATING ACCESS				
49.5	LT	X		Silver Bridge - no impact, could enhance if provide new boating/fishing access
50.5 - 50.7	RT	X		Blodgett Park - no impact (pulled alignment away)
52.0	RT	X		Woodside Cutoff - no impact
54.0	RT	X		Sheafman Creek Road - no impact
54.6	RT	X		Mill Creek - no impact, could provide pullout
56.0	RT	X		Tucker Crossing - no impact
61.1	RT	X		Bell Crossing - no impact
66.7	RT	X		Eastside Highway - no impact
66.8 - 68.0	RT	X		Stevensville River Road - no impact
70.0	RT	X		Bass Creek Fishing Access - no impact, will perpetuate, pulled alignment away
70.6	RT	X		turnout area - will perpetuate, pulled alignment away
71.5	RT	X		County Road - no impact

74.7	RT	X		Eastside Highway - no impact
82.2	RT	X		turnout area - will perpetuate
TRAIL HEAD ACCESSES				
49.8	LT	X		Blodgett Creek Trail Head Access - no impact
52.0	LT	X		Mill Creek Trail Head Access - no impact
56.0	LT	X		Bear Creek Trail Head Access - no impact
61.1	LT	X		Big Creek Trail Head Access - no impact
63.1	LT	X		St. Mary Peak Trail Head Access - no impact
69.4	LT	X		Kootenai Trail Head Access - no impact
70.4	LT	X		Charles Waters Recreational Area Access - no impact
PARKS / PICNIC AREAS / PLAYING FIELDS				
50.5 - 50.7	RT	X		Blodgett Park - no impact (pulled alignment away)
59.2	LT	X		Victor City Park - no impact (off right-of-way)
83.2	LT	X		baseball field - no impact, will use existing right-of-way
WILDLIFE REFUGES				
68.8	RT	X		Otto Teller Wildlife Refuge - public wildlife refuge east of Bitterroot River. Accesses off of Eastside Highway.
69.8	RT	X		Lee Metcalf National Wildlife Refuge - public wildlife refuge east of Bitterroot River. Accesses off of Eastside Highway.
INTERPRETATIVE SIGN PULLOUTS				
68.7	RT	X		Fort Owens/Stevensville Sign - no impact
69.0	LT	X		Fort Owens/Stevensville Sign - no impact
82.2	RT	X		Travelers Rest - no impact, will be perpetuated
MISCELLANEOUS				
53.8	LT		X	Bitterroot Driving Range - no impact
75.3 - 77.9	LT	X		trail - illegal de facto use of right-of-way, will be in excavation or fill areas, can be moved next to right-of-way or eliminated altogether
78.8	LT		X	Race track - no impact
79.0 - 79.4	LT		X	riding area or gravel pit - no impact
83.1	LT	X		Lolo Library - no impact

The "no action" and "no build" alternatives will have no impact on recreational facilities. Proposed sites for park-and-ride lots and bus or rail terminals would need to be reviewed to assure no adverse impacts to recreational facilities.

Table 4-16 indicates the only potential impact to recreational facilities is a trail inside the right-of-way left of milepost 75.3 to 77.9. All "build" alternatives have the potential to disturb this area; the narrow typical sections providing the least disturbance and the wider (4-lane divided) providing the most potential for disturbance.

The trail left of milepost 75.3 to 77.9 appears to be a pathway established to facilitate local resident access to the street on which the Carlton School is located. The trail is used by pedestrians, occasional horseback riders, bicyclists, and motorcycles. The trail coincides with the toe of slope and top of cut areas of the existing highway on the cleared portion of the right-of-way.

The development of this trail represents an illegal use of existing right-of-way. With "build" alternatives, the trail will be impacted in a few locations were additional fills or cuts are required. The trail could then be re-established on its own through continued use at the new toe of slope and top of cut areas, or it could be abandoned altogether as an illegal and unsafe use of the right-of-way.

The best solution may be to plan for a pedestrian/bike path in this area in recognition of the fact the trail has been developed and is used enough to keep vegetation from growing on it. Alternately, these movements may be accommodated on the 2.4 m (8 ft) shoulders associated with "build" alternatives although it would not be as safe as a separate path.

Wildlife Refuges: Neither the Otto Teller nor the Lee Metcalf National Wildlife Refuge will be adversely affected by any alternatives. Both of these facilities are east of the highway corridor across the Bitterroot River from the proposed transportation improvements. The proposed alignment at this location will pull westerly away from the existing, giving further separation from the refuges and helping to avoid adverse environmental impacts on the Bitterroot River. Furthermore, there are no direct access from the refuges to Highway 93. Access is gained by driving several miles up or downstream to the next nearest river crossing and then accessing the refuges from the Eastside Highway.

Indirect, Secondary, or Cumulative Impacts: With no adverse impacts to public recreational facilities, and the ability to perpetuate the trail just north of Florence, there will be no cumulative impacts related to recreational facilities.

Mitigation: It may be possible to mitigate the loss of the illegal trail north of Florence by creating another at the new toe of slope and top of cut areas, or it could be abandoned altogether as an illegal and unsafe use of the right-of-way. The best solution may be to plan for a pedestrian/bike path in this area in recognition of the fact the trail has been developed and is used enough to keep vegetation from growing on it. Alternately, these pedestrian and bicycle movements may be accommodated on the 2.4 m (8 ft) shoulders associated with "build" alternatives although it would not be as safe as a separate path.

D. MISCELLANEOUS CONSIDERATIONS

4.21 SHORT-TERM USES AND IMPACTS VERSUS LONG-TERM BENEFITS

The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity examines the trade-off of short-term environmental impacts versus the long-term benefits of the proposed action. If the impacts produce little benefit, then other alternatives should be investigated or perhaps the action should not be taken. Conversely, short-term impacts, disruptions, and uses of the local environment may be very much worthwhile in achieving the desired long-term benefits to the environment that would result from such actions.

Short-term uses and impacts to the local environment include the following. Specific discussion about impacts of the alternatives associated with these areas was given in the respective sections earlier in the chapter.

- construction impacts
  - noise
  - emissions
  - energy and fuel consumption
  - temporary stream turbidity
  - increased erosion potential
  - traffic disruption/congestion
  - ground disturbance/vegetation loss
  - visual degradation
  - risk of hazard material exposure
- wetland disruption or loss
- aquatic resource disruption
- displacement/mortality of wildlife and habitat

The long-term benefits to be gained from these short-term impacts through implementation of the proposed improvements includes the following items:

- safer, more efficient, and convenient transportation within the corridor
- improved access to properties, neighborhoods, communities, and the region
- economic opportunity, stability, and development
- accommodation of projected transportation growth
- enhanced opportunity for control of growth areas (can be obtained without transportation improvement)
- reduction of energy consumption and air and noise pollution
- replacement or enhancement of wetland functions and values

4.22 ENERGY

An Energy and Commitment of Resources Study[25] was conducted to determine potential impacts of the alternatives in these categories. A summary of the energy impacts follows, commitment of resources is discussed in the next section.

Common Impacts: Energy consumption related to any proposed improvements would be primarily related to the use of fossil fuels. This includes use of gasoline, diesel fuel, and lubricating oils in vehicles using the highway during operation and also in equipment during construction of any recommended improvements. All alternatives studied will require some energy commitment. Some of the alternatives offer a reduction in energy consumption, while others may potentially increase energy commitment as discussed below.

Specific Impacts: Direct energy impacts refer to the energy consumed by vehicles using the facility. The section in this Chapter on traffic and its anticipated growth indicated that none of the alternatives are expected to have a substantial influence on increasing traffic volumes beyond that which would occur regardless of whether improvements are undertaken. Therefore, changes in the consumption of energy result primarily from the effects of different alternatives on traffic flow.

The "no action" alternative creates the most significant impact with regard to energy as vehicular fuel consumption will continue to increase as traffic congestion worsens; thus resulting in stopping and starting, idling, and other inefficient fuel consumption. The deteriorating condition of existing highway facilities would continue or perhaps accelerate, further adding to energy use through increased maintenance requirements.

The "no build" alternatives have the opportunity to reduce energy consumption to the extent they can reduce the number of vehicles using the highway. According to calculations based on potential usage of these alternatives as predicted by the Traffic Study and public survey information, the energy reduction from these alternatives is expected to be about 2% of the total energy consumed by vehicles on the highway.

Implementation of the park-and-ride and passenger rail service will also require energy commitments for construction of those facilities.

All of the "build" alternatives would improve the efficiency of the highway to some extent. Traffic would flow more uniformly with less congestion and delays, allowing travel at more consistent and efficient speeds than on the existing highway. Turning movements would be made safer and more efficient; thus reducing the stopping and starting of following vehicles reacting to turning vehicles. This increase in efficiency, together with government mandated improvements to the efficiency of automobiles and other vehicles will result in a reduction of per vehicle energy use over existing conditions and also over the "no action" alternative.

Based on survey information taken from the Traffic Study, the average vehicle speed on US 93 is approximately 70 km/h (45 mph). Alternatives providing additional lanes would be expected to raise the average closer to 90 km/h (55 mph). Although this increase in speed results in a relatively small increase in fuel consumption, it will be overcome by the greater savings in fuel consumption resulting from more efficient traffic flow associated with these alternatives.

The "build" alternatives also require energy commitments during construction. To the degree that some alternatives require more earthwork or a greater disturbance of area than others (e.g. 4-lane divided vrs. 4-lane undivided), they will require a slightly greater commitment of energy to build. Likewise, the same holds true for the energy required to maintain them.

The realignment alternatives at Silver Bridge and Bass Creek Hill are expected to require essentially the same energy commitment as the existing alignment, with the possible exception that the improved grade at Bass Creek Hill may result in more efficient use of energy for vehicles (especially large trucks) climbing the grade.

Although the alternatives offering some form of transportation demand management (TDM) will not likely create a substantial reduction of fuel consumption in the near term, nevertheless establishment of the transportation management association (TMA) will likely be a significant step toward future energy savings. The function of the association is to provide greater public education on the negative impacts that occur from single-occupant usage of vehicles and will provide the development and management of programs (i.e. park-and-ride systems) to reduce vehicle usage. As these programs become more popular and widely accepted in the future and as other circumstances may arise that would naturally tend to reduce the dependence on fossil fuels (higher gas prices or limited supply), then the opportunity will exist for more significant energy savings through implementation and use of these programs.

Indirect, Secondary or Cumulative Impacts: The increase of efficiency offered by the "build" alternatives will likely result in a diminishing of the time required for commuting. This in turn may encourage commuters to travel longer distances if the amount of time does not increase. The longer commuting distance (estimated to be approximately 10 km [6.2 mi]) would result in about a 10% increase in fuel consumption. However, this impact will more than likely be offset by the improved efficiency in traffic flow and the reduction of fuel consumption it will allow.

Another possible indirect impact is that the build alternatives have the potential of increasing the long-term dependency on fossil fuel energy. However, unless supply becomes limited or alternate forms of energy are developed in the near future, the public's dependency on fossil fuel will likely continue to be strong regardless of whether improvements to the existing highway are constructed.

Mitigation: Ideas to reduce energy consumption and commitments to energy resources include the following:

- Establish a transportation management association (TMA) to educate the public and encourage the use of TDM techniques for reducing the amount of traffic on the highway, particularly the dependency on single-occupant vehicles.

- Carefully design any "build" alternatives to maximize the use of on-site materials, reduce haul distances, and minimize area to be disturbed. Use modular design systems and repetitive dimensions to permit more efficient construction, reuse of forms, and other energy saving techniques.

- Provide for adequate construction vehicle maintenance, turning off equipment when not in use, locating staging yards close to construction areas, and other similar energy saving ideas.

- Phase or sequence construction to reduce traffic delays and length of required detours.

- Properly perform preventative maintenance on the existing roadway or constructed alternatives to reduce the need for future large scale corrective measures necessary to overcome neglect.

4.23 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Implementation of the proposed action will involve a commitment of resources constituting an irretrievable and irreversible loss. Similar to the discussion above, these losses must be evaluated versus the benefits to be gained to determine if the proposed action is worthwhile and cost effective. A study on energy and commitment of resources[25] was conducted to examine the commitment of resources and the following is a summary of these commitments.

Implementation of proposed improvements would require additional land for right-of-way. Direct use of this land for highway purposes would remove it from current residential, commercial, agricultural, and industrial uses. This is generally considered as an irretrievable commitment during the time of use that could be reversed if the value of converting back or to another use is greater than what it is for transportation needs.

Section 4.15 summarized the right-of-way requirements for the various alternatives; the preferred alternative will require a total of 39.9 hectares (98.7 acres).

Significant quantities of gravel, steel, concrete, bituminous pavement, and other construction materials and equipment would be required to implement the proposed improvements. The study indicated approximate quantities of materials. A rough estimate of several significant quantities for the preferred alternative are:

- 336 meters (1100 ft) of bridges
- 270 culverts
- 106,800 cubic meters (140,000 cubic yards) plant mix pavement
- 93,600 cubic meters (122,400 cubic yards) crushed top surfacing
- 291,900 cubic meters (381,800 cubic yards) crushed base course
- 1.15 million square meters (1.38 million square yards) seal coat
- 1.3 millon cubic meters (1.7 million cubic yards) borrow material

These materials are generally considered irretrievable; however they are not in short supply and their use would not have an adverse or cumulative impact on the continued availability of these resources. Some such as gravel, pavement products, and steel may be recycled for further use.

Fuel would be consumed by equipment needed to construct the project, but would likely be counter-balanced by a net savings in fuel consumption from the resulting improvements in transportation efficiency.

Implementation of improvements would require an irretrievable commitment of human resources to design, construct, and maintain the facility. Planning, engineering, and related efforts, including the preparation of this EIS, represents a commitment of 20,000 to 30,000 manhours. Actual on-site construction labor may require an additional 150,000 manhours by the time all improvements are implemented in the entire 55 km

(34.2 miles) corridor. Ongoing maintenance, labor, and materials will also be required amounting to several hundred manhours per year.

Economic commitments are also considered an irretrievable investment. The anticipated cost for implementation of the preferred alternative is about $33.9 million including engineering and construction costs. Federal and State funds have already been committed and spent on planning the project and developing this EIS through conducting environmental studies. This represents a significant commitment to improving the transportation system in the Bitterroot Valley for all users.

Finally, some minor amounts of wildlife habitat will be lost and some members of the biological community (small mammals, birds, amphibians, etc.) may die as a result of short-term construction impacts. Unavoidable wetland impacts and their associated functions and values will be replaced or enhanced through appropriate mitigation. There is also a remote possibility for the loss of unknown historic or cultural resources if they are disturbed by construction and go undiscovered.

The commitment of these resources is based on the concept that transportation system users (including local, region, state, national, and international) will benefit by the proposed improvements to this important element of the transportation system. Primary benefits consist of:

- increased safety
- improved capacity and traffic flow
- improved access
- reduced air and noise pollution
- additional control of growth areas
- provision for economic development or stability

Taken as a whole, these benefits are considered to outweigh the commitments of irretrievable resources. Therefore, the improvements associated with the preferred alternative are recommended for implementation.

4.24 IMPLEMENTATION

The "no action" alternative requires no implementation effort. Otherwise, all other alternatives will require certain efforts for successful implementation. Construction and its related impacts are a major portion of this implementation effort for most of the alternatives.

The information below will discuss the general impacts associated with implementation and specific procedures required. A discussion of schedule and cost will be given to indicate the likely timeframe and commitments associated with implementation of improvements.

Common Impacts: Impacts related to construction and associated mitigation for the impacts have previously been presented in each of the sections of this chapter in accordance with the specific area of the environment impacted. To emphasize impacts associated with implementation, the following discussion will summarize the impacts principally associated with construction itself. Most of these impacts are short-term and temporary in nature and will occur in localized areas as construction progresses. Permanent effects of implementing improvement alternatives or any long-term impacts related to construction and implementation were discussed in previous sections of this chapter.

- Physical environment

    - short-term water quality degradation from sedimentation and turbidity
    - air quality degradation from dust, construction equipment emissions, and operation of crushing facilities and asphalt pavement plants

- construction noise
- risk of encountering hazardous materials or experiencing spills of hazardous materials during construction
- visual disturbance
- energy use
- surface disruption including removal of vegetation, displacement of materials, and importation of new material

• Biological Environment

- disturbance of fish and wildlife habitat including wetlands through dust, noise, and possible physical intrusion
- potential mortality of small mammals, birds, fish, and amphibians
- construction disruption of potential foraging areas near the highway and potential material sources used by wildlife and endangered or threatened species including the bald eagle and peregrine falcon

• Human Environment

- disruption or blockage of access to properties and neighborhoods, including potential disruption of community cohesion
- physical disturbance of business access and possible disruption of business activities
- economic stimulation through increased employment opportunities
- disruption or change in land use for staging areas and aggregate and pavement production
- inhibition of traffic flow, increase of congestion, traffic delays, detours, and required travel or rough and dirty surfaces
- disruption of pedestrian and bicycle facilities
- air, noise, visual, or possible physical disruption of historical/cultural resource areas
- potential restriction of access to recreation areas
- commitment of labor, materials, and financial resources to the design and construction efforts
- efforts to set-up, administrate, and manage systems necessary to implement "no build" alternatives including park-and-ride lots, bus system, and rail service.

Indirect, Secondary, or Cumulative Impacts: Since the impacts associated with implementation are predominantly short-term and temporary, no cumulative or indirect impacts associated with required implementation measures is foreseen. Permanent impacts and their cumulative potential are discussed elsewhere in this chapter.

Mitigation: Required mitigation for construction impacts and other long-term impacts associated with the eventual implementation of transportation improvements has been thoroughly discussed in other sections of this chapter. The following are a few additional mitigation measures that are worthy of specific mention:

• Strict adherence to permit provisions and other regulations to minimize construction impacts.

• Conformance to the MDT standard specifications for highway and bridge construction. Noteworthy provisions of the specifications are:

- employing standard erosion control practices in order to prevent or reduce water pollution potential
- replacing stockpiled topsoil and revegetating disturbed areas to reduce erosion and sedimentation potential
- application of water or chemicals to roads and construction areas and also establishing speed restrictions in order to minimize wind erosion and potential air quality impacts (dust)
- regulating the hours of construction to reduce potential noise impacts

- requirement for stoppage or modification of work activities when necessary to avoid additional or excessive adverse impacts

- Employment of design and construction efforts to minimize the areas of impact and disturbance.

- Development of thorough traffic control plans in order to reduce confusion, congestion, and frustration as well as maximizing access to the extent possible.

- Provide employment opportunities for local residents by employing them as general or skilled laborers (as appropriate) on construction work crews.

Permits: In order to comply with regulations established to reduce adverse impacts both during construction and on a long-term basis, it will be necessary to acquire several permits to properly implement proposed improvement. The following is a discussion of permits likely required according to common categories:

- <u>Water Quality and Water Use</u>

  - *3A Authorization:* The MDHES Water Quality Division may authorize temporary exemptions from surface water quality standards for turbidity, total dissolved solids, or temperature. Any person, agency, or entity (both public and private) initiating a short-term activity that may cause unavoidable short-term violations of water quality standards must apply for and obtain this authorization prior to beginning construction. The authorization may be waived by the Department of Fish, Wildlife and Parks if, during its review process under their own permits for natural streambed and land preservation act (310 permit) or streambed protection act (124 permit), provisions are made to eliminate or reduce these water quality impacts.

  - *124 Permit:* The Montana Stream Protection Act contains measures to ensure that fish, wildlife, and aquatic resources are protected and preserved. The Act requires any agency or government proposing a project that may affect the bed or banks of the stream in Montana to submit an application to the Montana Department of Fish, Wildlife and Parks (MFWP). Activities requiring the construction of new facilities or the modification, operation, and maintenance of existing facilities which may affect the natural existing shape and form of any stream or its banks or tributaries will require a permit.

  - *404 Permit:* Under the provisions of Section 404 of the Federal *Clean Water Act*, any person, agency or entity (public or private) proposing a project that will result in the discharge or placement of dredged or fill material into waters of the United States (including wetlands) will require a permit for such actions prior to construction. The permit application is submitted to the US Army Corps of Engineers for review and approval. Additionally, the Environmental Protection Agency has regulatory review and enforcement functions under the same law. Basically stated, a 404 Permit will be required for all stream crossings wherever new construction will occur. The 404(b)(1) evaluation contained in Appendix C is a major portion of the required application material and will have a significant effect on the provisions stipulated in the permit. Also, a specific detailed wetland mitigation plan will need to be prepared and approved before the project receives a 404 permit.

  - *401 Water Quality Certification:* MDHES must certify that any discharges into State waters will comply with certain water quality standards before federal permits or licenses can be granted. The authority for this action comes from Section 401 of the *Clean Water Act*. This certification must be provided to the Corps of Engineers prior to issuance of the 404 Permit.

  - *NPDES/MPDES Permit:* Both the federal and state governments have enacted legislation for the control of pollutants discharged into navigable waters from point sources. The National Pollutant Discharge Elimination System (NPDES) and a similar program for Montana (MPDES) authorize

these discharges under certain conditions with specific provisions. Permits relative to these actions will be required for discharge of storm water from storm drainage outfalls and dewatering of cofferdams for bridge or other structure construction. A related item to these permits is coverage under the *General Discharge Permit for Storm Water Associated with Construction Activity* and the establishment of a *Storm Water Pollution Prevention Plan* that the contractor will be required to follow during construction. The Plan utilizes best management practices at specific locations on the construction job to eliminate or reduce pollution potential associated with storm water runoff from areas disturbed by construction.

- *Temporary Water Use Permit:* Under the *Montana Water Use Act*, a temporary water use permit will be required if water is needed for dust control or other construction related purposes. This permit is issued by the Montana Department of National Resources and Conservation (DNRC).

- *FEMA Floodplain Development Permit:* Floodplain development permits are required for any new construction within areas designated as 100-year floodplains by the Federal Emergency Management Administration (FEMA). Activities requiring such a permit include road and bridge construction and placement of fills in floodplain areas. These permits are issued either by local floodplain development coordinators (where they exist) or the DNRC's Floodplain Management Section.

- *Wetlands Finding:* When disturbance of wetlands or waters of the United States is required it is necessary to conduct an analysis investigating alternatives to avoid or minimize such disturbances in compliance with the terms of Executive Orders 11988 and 11990 that have been established by the Federal Executive Branch to provide protection for wetlands and waters of the United States. These regulations are administered by the US Army Corps of Engineers through the 404 Permit process. It will be necessary to develop an *Only Practicable Alternative Finding* for compliance with these orders if disturbance to wetland areas is found to be unavoidable. The finding will be a part of the final EIS.

• Air Quality

- *Air Quality Permit:* Suppliers or operators of plants and facilities for crushing rock and producing mix for asphalt pavement must have an Air Quality Permit from MDHES Air Quality Division prior to beginning construction. The permits stipulate equipment required and practices and procedures necessary to properly mitigate short-term air quality impacts associated with such operations.

• Aggregate Production

- *Mine Reclamation Permit:* This permit establishes the procedures necessary to reclaim aggregate sources upon completion of construction in order to eliminate hazards, improve aesthetics, and otherwise avoid long-term adverse environmental impacts.

- *Construction Blasting Permit:* Contractors performing any blasting required for removal of rock or other obstructions necessary during construction must be licensed by the Safety Bureau of Labor and Industry - Workers Compensation Division. Additionally, local fire departments or fire marshalls may require additional permitting for blasting operations.

• Miscellaneous Permits

- *Section 106 Clearance:* Section 106 of the *National Historic Preservation Act* requires coordination with the State Historic Preservation Office to avoid adverse impacts on cultural or historic resources. A Section 106 Clearance may be required prior to construction for any historic or cultural resources potentially affected by implementation of improvements.

- *Hazardous Material Permit:* A Hazardous Material Permit from the MDHES may be required prior to disturbing, transporting, or attempting to dispose of any hazardous materials encountered during construction or utilized as a part of the construction process. The permit will establish safety precautions and mitigation measures to prevent adverse impacts associated with the handling and disposal of hazardous material substances.

- *State Land Use License:* The Montana Department of Natural Resources requires a land use license and a permit right-of-way for such usage of State lands. It is likely this license will be required for the new crossing of the Bitterroot River north of Hamilton and may be required for implementation of improvements to other transportation facilities (roads or bridges) crossing State lands.

- *Burn Permit:* Many local jurisdictions require a burn permit prior to disposal of construction debris by burning. The purpose of the permit is to reduce fire hazards and potential air pollution by restricting burning operations to certain times or seasons, or otherwise requiring conditions favorable to this activity.

Schedule: At this point, the exact schedule for implementing recommended improvements is unknown. However, it is possible to generalize schedule requirements and the probable timeframes for implementation activities based on the limited information presently available. The following discussion of the schedule is largely dependent upon public acceptance of the proposals and availability of funding to move forward into the design and construction phases.

This Draft EIS is being presented to the public for review and comments. After a sufficient period of review, public hearings will be held and the necessary changes or improvements to the document will be incorporated into the Final EIS. The Final EIS will be presented to the Federal Highways Administration for a formal decision contained in a document known as Record of Decision. It is anticipated that these activities will occur during the remainder of 1996 and the Record of Decision will be issued near the end of the year.

Once a Record of Decision has been issued approving implementation of the recommended alternatives, the projects will move forward into the design and construction phases, pending the availability of funding. For improved efficiency and to better match funding resources, it is likely the work associated with improvements recommended by this study will be broken into three major segments:

- Hamilton to Victor: A 16.1 km (10 mi) segment from milepost 49.0 to 59.0
- Victor to Florence: A 24.3 km (15.1 mi) segment from milepost 59.0 to 74.1
- Florence to Lolo: A 14.7 km (9.1 mi) segment from milepost 74.1 to 83.2

It is also likely that work on the individual segments will be prioritized according to the greatest need:

1) Florence to Lolo
2) Hamilton to Victor
3) Victor to Florence

Principally this results from existing and predicted traffic volumes associated with the segments and the associated need for improvement.

For a given segment, final design work will require approximately one year to complete. When final design is approved it will take an additional year to acquire right-of-way and access control. If considerable right-of-way is already available, this time can be greatly reduced. Relocation of utilities will likely take an additional three to six months. Then if funding is available, bids can be called for and construction will begin. Construction of the various segments will likely require eight to twelve months construction time, which will

probably result in two years of construction activities for a given project. Table 4-17 presents a likely schedule for implementation of the first segment (Florence to Lolo corridor).

TABLE 4-16 ESTIMATED SCHEDULE FOR FLORENCE-LOLO SEGMENT	
Activity	**Estimated Completion**
Record of Decision	December 1996
Final Design	December 1997
Right-of-Way Acquired	June 1997
Utilities Moved	November 1997
Bids Received	March 1998
Construction Begins	May 1998
Construction Completed	July 1999

The other two segments will likely begin design activities one to two years behind the Florence to Lolo segment and will proceed with much the same schedule as shown in Table 4-17 except the right-of-way acquisition for each is more extensive and will likely require an additional six months to complete. Completion of the Hamilton to Victor segment should be done by the year 2005 and the Victor to Florence segment soon thereafter.

It cannot be sufficiently emphasized that these schedules will change if unforeseen circumstances arise such as public controversy protracting obtaining the Record of Decision; difficulty is encountered in performing the engineering design, acquiring rights-of-way, or moving utilities; or if funding is not available or becomes delayed.

Cost of Implementation: Anticipated costs for the various alternatives were previously presented in Section 2.6. Table 4-18 presents the estimated implementation costs for the preferred alternative by project segment. Costs are in 1995 dollars without provision for inflation.

TABLE 4-17 IMPLEMENTATION COSTS OF PREFERRED ALTERNATIVE				
Activity	**SEGMENT (Cost in $ millions)**			
	Hamilton - Victor	**Victor - Florence**	**Florence - Lolo**	**Total**
Preconstruction				
engineering	$ 0.8	$ 1.3	$ 0.7	$ 2.8
r/w access control	0.1	0.2	0.1	0.5
utility relocation	0.5	0.8	0.5	1.9
Construction				
roadway	6.6	10.6	6.1	23.3
structures	1.0	1.6	1.0	3.5
inspection	0.7	1.1	0.6	2.3
Miscellaneous				
legal/administrative	0.5	0.8	0.5	1.9
	$10.3	$ 16.4	$ 9.5	$ 36.2

E. SUMMARY OF IMPACTS AND MITIGATION

4.25 SUMMARY OF CUMULATIVE AND INDIRECT IMPACTS

Cumulative impacts are defined as those which result from the incremental impact of a proposed action when added to other past, present, and reasonably foreseeable future actions. Indirect impacts are those that arise as secondary effects of implementing a proposed action. Each of the specific sections in this chapter on environmental consequences has attempted to identify potential cumulative and indirect impacts associated with that topic. Information that follows will present known related projects potentially contributing to cumulative impacts and will also summarize the cumulative and indirect impacts identified in previous sections to facilitate review and consideration.

Known Related Projects: Known related projects to the proposed action with an assessment of probable cumulative impacts are:

- <u>Proposed Improvements to US 93 North of Missoula from Evaro to Polson</u>. A Draft EIS has been issued and public hearings have been held on a recommended preferred alternative. Improvements to the highway, likely to be constructed about the same time as improvements in the Hamilton to Lolo corridor, will accommodate increased growth in the area and corresponding traffic. Improvements will facilitate traffic movements in western Montana in general and on US 93 in particular, leading to a potential for slightly increased traffic in the Hamilton to Lolo corridor related to commercial and tourist traffic. These increases are considered inconsequential to considerations already being made for the Hamilton to Lolo project.

- <u>Reserve Street Improvement in Missoula</u>. Construction has been completed or design is currently underway for construction of four lanes on Reserve Street in Missoula, a major collector along the west edge of Missoula connecting US 93 with Interstate 90. Commercial growth of that corridor, together with an appreciable component of through traffic seeking to "bypass" Missoula, has created the need for improved capacity. Although it will facilitate transportation and traffic movements close to the Hamilton to Lolo project corridor, it is not expected to produce cumulative impacts sufficient to alter plans for the Hamilton to Lolo corridor or add to their associated projected impacts.

- <u>US 93 Improvement Projects South of Hamilton</u>. Several projects on US 93 from the area south of Hamilton to the Montana/Idaho state line have either already been constructed or are currently in the design phase for improvements. These projects principally are upgrading the existing 2-lane roadway to a new 2-lane facility with safer curves, better sight distance, wider pavement, and flatter sideslopes. A similar project was just constructed on US 93 on the Idaho side of Lost Trail Pass. The improvements are primarily safety oriented and while they will undoubtedly encourage commercial and tourist traffic to use the US 93 corridor, the cumulative effects are negligible compared to the traffic volumes and growth anticipated in the Hamilton to Lolo area.

- <u>Eastside Highway North of Corvallis</u>. Plans have been completed for upgrading the existing 2-lane highway starting at Corvallis and running north a distance of 11.3 km (7 mi). Construction is anticipated to begin next year. Improvements to the road are principally for safety reasons with no overall increase in capacity. While these improvements will facilitate traffic movements on the Eastside Highway (a parallel local roadway to US 93 between Hamilton and Stevensville), impacts should not be cumulative to those of the Hamilton to Lolo corridor.

- Miscellaneous Commercial Development. Public scoping meetings and input from Advisory Committee members and local chambers of commerce have indicated plans for major commercial development such as shopping malls and related facilities within the project corridor. Principally these would be located at or near intersections of major traffic carriers with US 93 such as the Stevensville Y-intersection. Development of these commercial ventures is in response to the growth that has already occurred in the area, creating a viable market with strong potential for economic development.

  Cumulative impacts associated with these projects may be in regard to access and densification of development. Traffic on 93 is not expected to increase since it already carries most commercial traffic in the corridor. However, the developments may locally increase congestion or create sufficient warrants for traffic control devices such as signals. MDT and county planning offices will be reviewing projected impacts as specific plans for these developments are set forth. Appropriate mitigation measures will be required before approval of the developments.

Indirect, Secondary, or Cumulative Impacts Summary: The cumulative and indirect impacts previously presented with regard to specific topics in this chapter are here summarized for convenience.

♦ **Physical Environment**

- Water Resources and Quality: No cumulative or indirect impacts.

- Floodplains: Some additional floodplain encroachment anticipated. No adverse cumulative or indirect impacts if proper mitigation employed.

- Air Quality: Possible additional PM_{10} emissions to Missoula non-attainment area during construction and possibly before sanding material is removed in the spring. Positive cumulative effect if traffic congestion reduced; negative effect if congestion continues (no action).

- Noise: Some increase in noise levels associated with growth and development of the area. Coupled with noise from new development, a general increase in noise along the highway will likely result.

- Hazardous Materials: Cumulative impacts unlikely. Opportunity exists to improve overall environment through clean-up, mitigation, and remediation.

- Visual/Aesthetics: Detraction from viewing opportunities and visual quality if "no action". Additional degradation of visual quality in existing developed areas that may be densified through access control policies.

- Energy: Decrease in time of commute may increase length of commute; therefore more energy consumption. Likely to be offset by improved efficiency in traffic flow under preferred alternative. Build alternative may increase long-term dependency on fossil fuel energy.

♦ **Biological Environment**

- Wetlands: Further loss of wetlands from growth of area and pressures for development. Increase in potential sources of point and non-point sources of pollution from additional development of the area. Pressure for increased development leading to cumulative impacts comes from local growth and land use issues, not necessarily highway improvements.

- Wildlife: Indirect cumulative impacts resulting from an increase in human activity related to growth of the area. Development of previously undeveloped areas produces net loss of habitat. Greater human/animal interaction likely. Some loss of habitat and displacement of wildlife associated with

highway improvements. The proposed action may reduce vehicle/animal collisions and animal mortality through greater opportunity to avoid collision.

- Fish: Continued opportunity for spills from accidents. Minor increase in stormwater runoff from impervious areas if preferred alternate implemented.

- Threatened and Endangered Species: No significant cumulative impacts. Some potential for loss of habitat from growth of the area.

♦ **Human Environment**

- Social: Additional development from growth of the area. Loss of community character and cohesion (to strip development) if "no action". Improved social opportunities to interact through improved transportation.

- Economics: More efficient transportation and improved economic activity. Net reduction of travel time and improved access to intermodal transportation facilities.

- Land Use: Continued growth of Bitterroot Valley and pressure for additional development. Conversion of agricultural and undeveloped property to residential and commercial in response to growth pressure. "No action" results in continual "in-filling" of presently undeveloped areas (strip development). Potential for expansion of "bedroom community" limits.

- Farmland: Direct conversion of farmland to residential, commercial, and industrial development resulting from growth and development of project area. Some loss of farmland directly related to highway usage.

- Transportation: Consistency with other constructed or planned developments on US 93 in western Montana. Improvement of transportation facilities to meet the demands placed on them by growth and economic development. Potential increase in interstate and truck traffic from inclusion in NHS, improvements to nearby segments, and passage of NAFTA. Reduction of accidents and safety concerns. Opportunities for transportation demand management and opportunities for incorporation of pedestrian and bicycle facilities.

- Historic/Cultural Resources: Further growth and development of the area provides pressure to develop new areas; thus creating the potential to destroy unknown historical resources and overrun those eligible or potentially eligible for listing. Possible isolation of existing resources from surrounding environment due to new development.

- Recreation: No cumulative impacts anticipated.

4.26 SUMMARY OF ENVIRONMENTAL IMPACTS

Table 4-19 summarizes the impacts associated with all alternatives. The purpose of this table is to provide easy comparison of impacts among alternatives in a relative manner.

The table gives ratings to each alternative under a given topic ranging from potentially beneficial to neutral to adverse in accordance with the following numerical formula:

- 1 = "least impact" or "most beneficial"
- 2 = less impact or slightly beneficial

- 3 = no impact, average, or "neutral"
- 4 = some impact or less beneficial
- 5 = most impact or least beneficial

Tables 2-11 and 2-12 in Chapter 2.0 present a more specific evaluation of alternatives with regard to environmental impacts and meeting the purpose and need, respectively.

TABLE 4-18
COMPARISON OF IMPACTS ASSOCIATED WITH ALTERNATIVES

Area of Impact	No Action	Park and Ride	Bus	Rail	Modified 2-lane	4-lane Undivided	4-lane Divided	5-lane	Preferred Alternative
PHYSICAL ENVIRONMENT									
Surface Water	4	3	3	4	5	4	4	4	4
Groundwater	4	3	3	4	4	4	4	4	4
Floodplains	3	3	3	4	3	4	5	4	4
Air Quality	5	3	3	3	3	2	2	2	2
Noise	4	2	2	2	3	3	2	3	3
Hazardous Materials	3	2	2	2	3	3	4	3	3
Visual/Aesthetics	5	3	3	3	3	2	2	4	3
Energy	5	3	3	3	4	2	2	2	2
BIOLOGICAL ENVIRONMENT									
Wetlands	3	3	3	4	3	4	5	4	3
Wildlife	3	2	3	3	4	3	3	4	3
Fish	3	3	3	3	3	3	4	4	3
Threatened & Endangered Species	3	3	3	3	3	3	4	4	3
HUMAN ENVIRONMENT									
Community Cohesion	4	3	3	3	4	3	4	4	3
Access	3	3	3	3	3	4	4	2	2
Barriers	5	3	3	3	4	3	4	4	3
Displacement	3	3	3	3	3	3	4	4	3
Economic Development	4	3	3	3	3	2	2	2	2
Land Use	4	3	3	3	3	3	2	4	3
Right-of-Way	3	3	3	3	3	4	5	4	4
Farmland	3	3	3	3	3	3	5	4	3
Transportation Modes	4	2	2	4	3	2	2	2	2
Highway Condition	5	5	5	5	4	1	1	1	1
Capacity/LOS	5	4	4	4	3	1	1	1	1
Safety	5	4	4	4	4	2	1	2	2
TDM	5	1	2	2	3	3	3	3	3
Pedestrian/Bicycle	4	4	3	4	3	2	2	2	2
Transportation Plans	5	3	3	3	2	2	2	2	2
Historical Resources	3	3	3	3	3	3	4	3	3
Cultural Resources	3	3	3	3	3	3	4	4	3
Recreation	4	3	3	3	3	2	3	2	2
MISCELLANEOUS CONSIDERATIONS									
Purpose and Need	5	4	4	4	4	1	1	2	1

Resources	2	3	3	4	3	4	4	4	4
Cost	3	1	2	5	3	4	5	4	4
Cost/User	3	1	3	5	2	3	4	3	3
Implementation	3	2	2	3	3	3	4	3	3
Cumulative Impacts	5	3	3	3	4	3	4	4	3

4.27 SUMMARY OF MITIGATION MEASURES

Table 4-20 consolidates the recommended mitigation measures into a central location for ease of review and consideration.

TABLE 4-19
SUMMARY OF MITIGATION MEASURES

Impact Area	Recommended or Potential Mitigation
PHYSICAL ENVIRONMENT	
Water Quality	
Surface Water	• Development and design of an erosion control work plan based on best management practices and approved by the Montana Water Quality Division. Goals of the erosion control plan will be to: - design the development to fit the project setting - minimize the extent of disturbed area and duration of exposure - stabilize and protect disturbed areas as soon as possible - keep runoff velocities low - protect disturbed areas from runoff - retain sediment within the corridor - implement a thorough maintenance and follow-up program Best management practices will include: - slope roughening - temporary and early seeding - mulching - erosion control blankets - straw blankets - gravel filter berms - ditches and settling basins - pumping dewatering operations to settling basins - silt fences - streambank protection • Use fill materials that are chemically stable, composed of common, naturally-occurring aggregates or materials found in the Bitterroot Valley. • Develop construction practices, safety plans, and contingency procedures to prevent spills of hazardous materials during construction and contain them if they do occur. • Design structures (culverts and bridges) to not obstruct or change flow characteristics in creeks and rivers. • Provide gentle sideslopes to roadway for snow retainage, filtration, and gradual release of runoff. • Minimize the extent of areas disturbed during construction and the duration of such exposure prior to revegetation. • Design storm water collection and conveyance systems in "urban" areas to be properly managed. • Restrict construction vehicle operations on unpaved areas.

Groundwater	• Use chemically stable fill materials that match the characteristics of naturally occurring aggregates and materials in the project area. • Develop a spill prevention plan and emergency response plan to take care of spills or encounters of hazardous materials during construction or operation of the highway. • Pump any water out of excavations into stilling basins where it can be settled and tested for water quality prior to reintroduction into the groundwater. • Design to prevent the disturbance of shallow groundwater flow patterns and quality wherever possible. For example, irrigation canals, ditches, and agricultural drainage systems should be maintained in their existing location and condition to the extent practicable. • Provide for continuation of surface flow patterns through the corridor and avoid creation of new impoundment areas where percolation may introduce additional pollutants or alter groundwater hydrology. • Implement the best management practices discussed under the surface waters section to control erosion water runoff and potential percolation of contaminants into groundwater resources.
Floodplains	• Design for adequate structure or culvert size at each crossing to keep impacts to a minimum. • Coordinate closely with the County Floodplain Administrator to review potential impacts and obtain design guidance and recommendations for minimization. • Design to keep proposed profile grade for any "build" alternatives that are above the existing present traveled way to a minimum in floodplain areas to reduce the need for additional fill encroachments on floodplains. • Consider using bridges in place of culverts where possible to reduce encroachments on floodplains. • Consider lengthening approach guardrail (where used) and steepening adjacent sideslopes to minimize impact on floodplain areas.
Air Quality	• Spraying exposed soil and storage areas with water. • Providing wheel washers to clean particulate matter from vehicles. • Equipping construction equipment with appropriate emission controls. • Sweeping public roads daily to remove particulate matter deposited by construction vehicles. • Using paved roads wherever possible for detours, or watering or chemically stabilizing unpaved detour roadways. • Burning slash piles in compliance with open burning restrictions (including obtaining a burning permit from the County). • Assuring that portable rock crushing equipment and asphalt plants associated with "build" alternatives meet applicable emission limitations and have proper air quality permits from MAQD.
Noise	• restrict development in areas close enough to the highway to be impacted • adjust line and/or grade if possible near critical receptors • enclosures or barriers of construction areas • mufflers on construction equipment engines • substituting more quiet equipment or construction methods • minimizing time of operation (generally day time hours 7 am to 5 pm) • locating equipment farther from sensitive receptors • keeping detours away from sensitive noise areas • staging or sequencing construction to avoid protracted activities in a given locale
Hazardous Materials	• remediate areas of hazardous material known to exist in the right-of-way and encourage private landowners to clean up hazardous material areas. • excavation, removal, and disposal of contaminated soil in accordance with state-of-the art practices and regulations • land farming (spreading contaminated soils over an evenly distributed area and providing the area with nutrients and vegetation to break down the waste products) • removal and proper disposal of hazardous material (i.e. railroad ties) and surrounding surface soils before it is converted to public right-of-way • paving and/or landscaping to cover or protect contaminated areas from erosion and further spread of the materials • establishing spill prevention and containment procedures by emergency services personnel and highway maintenance authorities should establish spill prevention and containment procedures to quickly respond and react in the event of an accident, spill, or other inadvertent contamination • following handling and disposal recommendations to properly care for the materials during clean-up operations

Visual/Aesthetics	• Carefully designing line and grade to match existing topography as best possible, use curvalinear alignment to break up long tangent section and design pull-out areas for vistas and viewing opportunities. • Designing cut and fill areas to match surrounding ground as best possible, eliminate guardrail, flatten or naturally round slopes, and remove visual barriers (e.g. daylighting cut sections where possible). • Using narrower sections or structures to protect sensitive areas, reduce disturbance, minimize fills, bridge over vegetative riparian area, preserve habitat, and cross floodplains at the narrowest possible spot. • Preserving existing vegetation, leaving trees within the right-of-way wherever possible, promptly revegetating disturbed areas using native vegetation, landscaping, reclaiming, providing vegetative screening of unsightly areas, selectively clearing, and reducing erosion potential. • Developing and implementing land use planning policies to protect scenic resources, control land use, protect undeveloped areas, limit (or encourage) access, enhance park and recreational opportunities, and set aside conservation or scenic easements. • Employing beautification measures in urban areas to provide decorative lighting, conversation corners, tree or shrub pockets in sidewalks, and other similar measures to preserve or enhance community character and provide cohesion. • Burying utility lines underground utilize vegetative screens to hide utility installations or other unsightly developments wherever possible. • Maintaining the landscaping by planting, pruning, mowing, cleaning up, and encouraging citizen and community involvement in enhancing the visual attractiveness of the transportation corridor.
Energy	• Establish a transportation management association (TMA) to educate the public and encourage the use of TDM techniques for reducing the amount of traffic on the highway, particularly the dependency on single-occupant vehicles. • Carefully design any "build" alternatives to maximize the use of on-site materials, reduce haul distances, and minimize area to be disturbed. Use modular design systems and repetitive dimensions to permit more efficient construction, reuse of forms, and other energy saving techniques. • Provide for adequate construction vehicle maintenance, turning off equipment when not in use, locating staging yards close to construction areas, and other similar energy saving ideas. • Phase or sequence construction to reduce traffic delays and length of required detours. • Properly perform preventative maintenance on the existing roadway or constructed alternatives to reduce the need for future large scale corrective measures necessary to overcome neglect.
BIOLOGICAL ENVIRONMENT	
Vegetation	• Limit the area of disturbed land and the duration of construction. • Restore and reseed disturbed areas immediately after construction. • Relocate sensitive plants and protect nearby populations if such are found. • Develop and implement aggressive weed prevention and eradication program. • Consider developing a landscaping plan and providing renewed vegetative communities and beautification schemes throughout the corridor.
Wetlands	• Develop and follow a highway construction standard erosion control work plan, which includes implementation of best management practices during construction. • Ensure that the project conforms to the natural existing characteristics of the aquatic ecosystem and surrounding terrain. • Limit the duration and the area of disturbed land. • Restore and reseed the disturbed areas immediately after construction. • Control storm runoff by reducing velocities, retaining sediments, and properly maintaining erosion control features. • Ensure proper maintenance of erosion control structures and methods. • Time disturbances of the aquatic ecosystem to avoid sensitive periods such as breeding, migration, etc.
Wildlife Avoidance of Habitat Disturbance	• Carefully design highway alignment and grade to avoid and then minimize habitat acquisition or disruption. As with wetlands, provide replacement and enhancement for those areas where avoidance is not possible. • Provide means to reconnect fragmented habitat areas by providing crossings, hydrologic and physical interconnection, removal of barriers, etc. • Provide cavity habitat opportunities such as bird boxes and nesting platforms. • Minimize direct loss of wildlife, nesting sites, and mortality to the young by coordinating initial disturbance of ground to occur in summer, fall, or winter. • Minimize removal or displacement of roadside vegetation wherever possible. • Revegetate and replant disturbed areas with native vegetation. • Employ civic groups, service organizations, or interested individuals to canvas habitat areas proposed for disturbance just prior to construction to assist in trapping and relocating mammals, birds, reptiles, amphibians, etc.

	• Provide perching and nesting opportunities for birds in open agricultural and grassland areas away from the highway right-of-way. • Raptor-proof powerlines.
Animal Crossing Areas	• Construct underpasses (or use bridge for stream) for mammals, herptiles, and other wildlife in the Bass Creek area and explore the possibility for use in other locations. • Use bridges instead of culverts in riparian areas to enhance crossing opportunities. • Design and install culverts to the extent practicable or drainage pipes in a manner to facilitate wildlife passage, specifically for aquatic and small animals. • Avoid or minimize the use of guardrail, median barriers, fencing, or other deterrents to wildlife crossing. • Construct bridges with large open main spans to provide visibility of habitat on the opposite side and encourage free and open use for crossing by wildlife. In some cases "channeling" fences may be appropriate to encourage use of the crossing by wildlife.
Deer Road Kill Problem	• Initiate a driver education program to increase awareness of the problem and teach defensive driving related to animal avoidance. • Advertise the potential for animal collisions with additional warning signs (perhaps with flashers), labeling the area as having high deer activity on state road maps, and utilizing media and advertising to increase operator awareness. • Reduce or eliminate use of road salt or similar compounds in highway maintenance. • Remove attractive vegetation or plant non-palatable species along the highway to reduce attraction. • Consider the use of wildlife underpasses and bridges instead of culverts as noted above. • Other mitigation measures such as reflectors, mirrors, deer whistles, wildlife retention fences, etc., were generally considered by the Deer Kill Study to be ineffective in reducing animal/vehicle collisions. However, trial areas or demonstration projects may be attempted to determine if these measures may have specific application to the Bitterroot Valley.
Miscellaneous Provisions	• If found, relocate sensitive plants and protect nearby populations. • Develop and implement aggressive weed prevention and eradication program. Carefully design and review seed mixtures used for revegetating areas disturbed by construction to prevent weed growth and proliferation. • Continue coordination and communication with wildlife service agencies to enhance mitigation measures or implement new technology as it becomes available.
Fish	• The engineering design of "build" alternatives should carefully consider avoidance of rivers and streams to reduce impacts. Specific elements could include: - shifting the alignment away from water courses - crossing rivers and streams as near to a right angle as possible (reduce area of impact) - using bridges instead of culverts wherever possible - providing for stabilization of stream banks by following recommended practices in accepted design manuals. - carefully designing culverts to minimize water velocity and maximize fish passage by proper elevation placement - using flat bottom or open bottom wherever possible when a culvert is indicated - carefully coordinate with Montana FW&P's biologist and other interested agencies during the design and construction of all stream crossings - removing Silver Bridge abutments, piers, and approach embankments from the channel • Employ the use of best management practices for erosion control. This includes: - constructing silt fencing to prevent sediment from reaching water bodies - using straw bales in borrow ditches to prevent erosion and sediment transport - quickly reseeding and revegetating disturbed areas including embankments and borrow ditches - planting bumper strips of vegetation between construction areas and water bodies to trap sediment, control erosion, and maintain and enhance fish habitat - using rip-rap or other stabilization measures for channel banks - using clean fill if encroachment in aquatic areas is necessary - maintaining and protecting existing riparian vegetation where removal is not necessary • Proper implementation of measures during construction to reduce spills and minimize disruption to instream flows through water removal or stream inhibition. • Construction of stream crossings should be timed to minimize the impact on spawning fish. A late summer construction period will be least harmful to rainbow and brown trout.Late season construction may be undesirable for westslope cutthroat trout if they exist in the lower reaches of the streams.

	• Coordination with land use planning officials and local property owners to examine land management practices near stream crossings and aquatic resources. In the past some practices have resulted in losses of riparian vegetation and development of non-point sources of pollution.
Threatened & Endangered Species	• Survey the project area and related sites (gravel sources, crushing sites, disposal areas, etc.) and a zone of 1.6 km (1 mi) around these areas prior to construction of any recommended alternative to determine the existence of new nest territories. If such is found the project should be reviewed again by a biologist for potential impacts to threatened and endangered species and the results documented in an amendment to the Biological Assessment. Special coordination measures or alternative plans may be necessary to avoid impacts to nesting eagles. • Continue close coordination with the US Fish and Wildlife Service and the Montana Dept of Fish, Wildlife and Parks during the design and construction phases to assure minimization of potential impacts to these species. Features such as proposed timing of construction, location of areas to be disturbed, construction methods, sequencing, etc., should be reviewed to assure they do not produce further or unforeseen concerns that may lead to potential impacts. • Raptor-proof overhead powerlines relocated or constructed as a result of the implementation of any alternative following criteria outlined in the raptor research report #4, "*Suggested Practices for Raptor Protection of Powerlines - The State-of-the-Art in 1981*" or other similar accepted methods if proven more effective or generally accepted at the time such construction is undertaken. • Promptly remove road killed deer and wildlife to prevent foraging of eagles and falcons on carcasses and reduce the possible collisions with vehicles and interaction with humans. • Carefully design proposed improvements to maximize avoidance and minimize wetland and habitat losses. Where such loss is unavoidable, develop a plan for mitigation of wetland loss that will replace functions and values, develop new suitable habitat, and enhance the quality of existing wetland and habitat areas. • Establish buffer zones or conservation easements associated with current land use planning efforts to help mitigate the cumulative affects of habitat loss from increasing development. Alternately, existing refuge areas such as the Lee Metcalf Wildlife Refuge or developing other habitat that may be created in response to required mitigation for impacts on this or other projects will also help offset this cumulative impact.
HUMAN ENVIRONMENT	
Social	• The key to organizing or controlling growth in the area is through development and implementation of land use planning efforts. Individuals and groups concerned over the growth issue will be far more effective in addressing growth through involvement in planning efforts for land use than in attempting to control growth through a restriction of transportation facilities or improvements. While transportation planning cannot force development and implementation of land use policies, it can be crafted to be consistent with and support those measures adopted or considered desirable by the local community. • Implementation of land use control policies and access control measures will do much to determine where growth will be and the timing of when it occurs. Proper combination of these two items can do much to encourage densification of already developed areas and provide protection from or controlled growth in rural, undeveloped areas. • To develop community character and improve community cohesion, individuals can become civic minded and get involved in groups and programs aimed at bettering and planning for the future character of the community in which they are located. Groups already organized may consider networking or partnering with other established groups to achieve a wider zone of influence and provide better opportunities for successful implementation of their ideals. Additionally, efforts can be made by individuals and groups to go out of their way and include the people from other areas or neighborhoods of the community in planning, recreation, or other activities and causes. • Engineering design of any proposed improvements should look carefully at ways to reduce barriers and potential isolation. Similarly, the design can likely be adjusted to avoid displacements or relocations and to minimize other undesirable impacts wherever possible. Studies can be made of pedestrian movements and other high side stream traffic locations to determine if warrants exist for traffic control measures, pedestrian crossings, or other similar special features. • Where displacements of individuals or businesses are required, careful implementation of the policies contained in the *Uniform Relocation Assistance and Real Property Policies Acquisition Act* will protect the rights of individuals and assure they are fair treatment and full compensation in relocating their properties or being displaced to accommodate the greater public need. • Emergency service personnel and school traffic may plan alternate routes, modify schedules (as much as possible), or otherwise develop alternate plans to avoid problems created by congestion and the barrier affect of US Highway 93. • Individuals and groups can do much to promote the cause of, and utilize, transportation demand management measures to reduce traffic on the highway. The high dependence on single-occupant

	vehicles for commuting purposes is at the root of the need to improve transportation in the corridor. Therefore, it is directly or indirectly responsible for all impacts identified by this study. The sacrifices and efforts made to make these measures successful will only bring positive benefits in terms of reduction of congestion; improvements to noise, air, and water quality; improved safety; increase energy conservation; and a general overall reduction of adverse impacts as identified by this study. • Public demand is a key ingredient in cutting through bureaucracy and getting things accomplished. Individuals and groups should make their desires known to government and civic leaders, become educated in the rules and regulations that guide decision making, and becoming proactive to planning processes to see that their desires and ideas are incorporated.
Economic	• Implementation of land use and access control policies will encourage commercial development in proper areas and reduce corresponding negative impacts if allowed to occur elsewhere. • Local citizens should be especially vigilant about supporting local businesses to help provide a strong basis for continued economic activity and growth. • Local business groups and organizations such as the Bitterroot Chamber of Commerce should continue economic planning and program development. They should actively pursue plans already established in seeking funding for economic development, providing for diversity to meet changing market demands and forces, trying to attract environmentally friendly businesses to the area, and developing ways to take advantage of increasing trade and tourist traffic through the area. • Proper engineering design of improvement alternatives can do much to improve access, provide safer turning movements, enhance pedestrian and bicycle facilities and avoid negative impacts or disruption to existing business insofar as possible.
Land Use	• The public (including individuals, groups, and organizations) should become pro-actively involved in local governmental efforts to develop and implement land use planning policies. Similarly, the cities and counties should continue efforts to develop and implement these policies as it will produce the most significant effect on determining future land use, growth areas, and rate of development. • Access control policies should be adopted to compliment, support, and enhance the land use planning policies established by local governments. A combination of permissive, restrictive, and situational access control will help achieve the goals in the currently proposed comprehensive plan to densify existing development and protect rural, undeveloped, and agricultural properties. In addition to helping determine where development will occur, these access control policies can also be used to help control the rate of growth and development. • Engineering design of transportation improvements can be done in such a manner as to minimize the need for additional right-of-way, perpetuate access to existing developed areas, and provide for the orderly accommodation of access from areas proposed for development. • Where the need for new right-of-way is known to exist and where construction may not occur for a considerable period of time, new right-of-way should be purchased in advance in order to preserve the corridor, protect adjacent land uses, and avoid adverse land use impacts if development is allowed in the area in the interim. • Existing features of the existing highway associated with land use such as stockpasses, frontage roads, etc., should be perpetuated to protect the land use. Similar features should be incorporated in any "build" alternatives to further preserve and enhance land use.
Farmland	• Adoption and implementation of land use policies can protect and preserve agricultural areas from being converted to other usage. • Proper implementation of access control policies in conjunction with land use regulations can provide additional protection by discouraging development in agricultural areas and encouraging development in more suitable areas. • Proper engineering design can be employed to avoid farmland areas if at all possible and minimize the need for acquisition and conversion of agricultural properties to highway use through adjusting horizontal and vertical alignments and steepening cut and fill slopes wherever possible.
Transportation	
Transportation Modes	• Continue efforts at public eduction and awareness to encourage the use of alternative modes of transportation. • Assure continued access and as little restriction to travel as possible during construction to reduce interference with intermodal connections.
Physical Highway Conditions	• Continue to maintain present highway facilities, correcting deficiencies, and providing preventative maintenance to prolong the life of existing facilities until such time as more permanent improvements can be made. • Provide proper enforcement for highway load limits, vehicle configuration, and restricted speeds (sea-sonally as necessary) to protect against further pavement deterioration and destruction to the extent possible.

	• Perform regular inspections of transportation facilities to discover and address problems before they create major adverse impacts.
Traffic, Capacity, and Level of Service	• Provide traffic control measures where necessary to properly control traffic and pedestrian movements. Investigate critical areas for warrants for signage or signalization in accordance with the manual on *Uniform Traffic Control Devices*. Implement only those traffic control measures that are warranted to avoid creating further problems. • Encourage new development to access local streets first and consolidate local streets into the minimum number of access possible on US 93. • Encourage local travelers to utilize local roads as much as possible to help relieve congestion on the main highway. • Implement access control, particularly in rural areas, to reduce the number of accesses; thereby improving traffic flow.
Safety	• Provide appropriate signage, warning of inherent dangers, particularly addressing the high potential for animal collisions in the corridor. • Enforce the posted limits, both for maximums and for slow drivers as well. • Conduct public education and awareness campaigns to educate the public about proper use of turning lanes, traffic control devices, and other facilities provided to improve safety on the highway. • Separate pedestrian and bicycle facilities from the roadway to the extent possible.
Deer Kill	• In general, narrower pavements (fewer lanes) can be a benefit in reducing the potential for mortality for many forms of wildlife. Alternately, wider shoulders and additional travel lanes do provide a greater opportunity to safely avoid animal collisions. • Dividing structures such as jersey barrier or continuous guardrail should not be used. Painted dividers or narrow medians lacking vertical structure are preferable. • Wider rights-of-way and clear zones void of vegetation increase overall traffic safety but result in wildlife habitat loss. It is recommended that MDT consider the development of right-of-way management plans formulating management practices to balance the need for safety against the potential loss of a resource under encroachment. The plan should also incorporate vegetation management within the right-of-way and clear zones to eliminate vegetation attractive to wildlife species (especially deer) and replace it with less palatable species. • Consideration should be given to changing deicing operations to substitute for or reduce the amount of salt, which is an attractant to deer in the clear zones and along the edges of the roadway. • A continuation of promptly removing roadkill is considered sound management. This reduces the risk of additional mortality to other scavengers, both wild and domestic. • Exclusionary right-of-way fencing, constructed animal crossings, signing and nighttime speed reductions, deer whistles, and game management manipulation hold little, if any, promise for this area. However, equalizing culverts for passage of smaller animals is recommended for any highway-bisected wetlands or habitat areas. Management tools with more promise include highway illumination, Wolfin chemical repellent, and Swareflex reflectors. Unfortunately, the pervasive nature of the deer kill problem throughout the corridor raises questions over cost versus benefit for implementing these measures. It is recommended to conduct feasibility tests in limited areas to determine and identify the more promising solutions. • Development and implementation of a driver awareness public education program is recommended. The bottom line is better training in defensive driving. Training on knowing what to look for, what and what not to do in the event of an imminent collision, and also what to do or avoid after a collision are all important factors. Critical danger warning signs on the highway and perhaps inserts or markings on State tourism maps delineating critical deer kill areas could help. • The more that is understood about the deer kill problem, the greater the possibility of implementing reduction measures. It is recommended to continue keeping deer kill statistics, coordinating with wildlife management personnel, and developing "partnering" relationships among agencies and the public to provide both the mechanisms and funding for continued research and trial implementation of potential reduction measures.
Access	• Sign for "Right Turn Only" onto the highway from side streets at minor intersections. • Use access control where appropriate to encourage or discourage access. • Consolidate access points to the extent possible. • Encourage businesses to access cross streets or the next street parallel to the highway for their business deliveries and also for customers, if possible. • Provide turning lane facilities (both left and right) where warranted to accommodate areas with a higher need for access.

Transportation Demand Management	• Continue efforts to establish a transportation management association by providing leadership and start-up funding. • Conduct a considerable public education campaign to make the general public aware of the need for and the positive benefits of traffic reduction techniques. • Provide employer incentives in terms of preferred parking, extra compensation, special perks, or other similar measures for those willing to carpool or utilize alternative modes of transportation. • Develop individual and collective willingness to sacrifice for the greater public good through supporting and utilizing TDM activities to reduce traffic and congestion on the highway.
Pedestrian and Bicycle Facilities	• Provide for improved pedestrian/bicycle facilities whenever possible and separate them from the highway when feasible. Conduct public education campaigns increasing the awareness of the opportunity to utilize pedestrian and bicycle facilities as alternative modes of transportation. • Provide bicycle friendly facilities at businesses, recreational centers, and public facilities to facilitate and encourage pedestrian/bicycle use
Transportation Plans	• Continue planning efforts to control growth and protect the efficiency and function of major transportation systems in the area. • Provide public involvement opportunities to discuss transportation systems and improvements. • Encourage new development to access local streets wherever possible and to incorporate TDM provisions in the design to make these developments more conducive to alternative forms of transportation.
Historic Resources	• Design to avoid historic properties altogether wherever possible. If not, design to minimize impacts to the greatest extent possible by carefully examining line and grade, steepening sideslopes and utilizing the narrowest section possible while still meeting the stated purposes and needs for improvements. • Continue close coordination with the State Historic Preservation Office during any design efforts to assure no changes that may adversely affect eligible properties. If a given property is deemed eligible and if there are potential impacts, a memorandum of agreement will need to be established between MDT and SHPO to reduce impacts and otherwise design for acceptable historic preservation of the property. • Immediately halt construction and consult with authorities responsible for historic preservation if historic resources or potential resources are encountered or discovered during construction. • Perpetuate signing of historically significant sites and consider creation of signing for those deemed eligible by SHPO. • Perpetuate or construct pull-outs at significant historical sites (i.e. Travelers Rest) to enhance appreciation and understanding of the historic resources.
Cultural Resources	• Further consultation and coordination with the cultural committees of tribal groups associated or potentially associated with these cultural resources is essential. • Further investigation of the resources themselves is recommended (if agreed to by the cultural committees) to demonstrate the presence or absence of material that can be used to address pertinent archaeological research and demonstrate the potential for the site(s) to be placed within a meaningful temporal or cultural context. • Further coordination with SHPO on the eligibility and measures to protect or mitigate these sites is also recommended. • Engineering design of recommended improvements should look first at avoidance of the sites altogether and then at reduction of potential impacts through alignment shifts, steepening of slopes, use of narrowest possible section, etc. • If cultural resources known or unknown are disturbed or encountered during construction, work should be halted and consultation with tribal cultural committees and cultural resource experts should begin immediately.
MISCELLANEOUS	
Construction	• Strict adherence to permit provisions and other regulations to minimize construction impacts. • Conformance to the MDT standard specifications for highway and bridge construction. Noteworthy provisions of the specifications are: - employing standard erosion control practices in order to prevent or reduce water pollution potential - replacing stockpiled topsoil and revegating disturbed areas to reduce erosion and sedimentation potential - application of water or chemicals to roads and construction areas and also establishing speed restrictions in order to minimize wind erosion and potential air quality impacts (dust) - regulating the hours of construction to reduce potential noise impacts

	- requirement for stoppage or modification of work activities when necessary to avoid additional or excessive adverse impacts • Employment of design and construction efforts to minimize the areas of impact and disturbance. • Development of thorough traffic control plans in order to reduce confusion, congestion, and frustration as well as maximizing access to the extent possible. • Provide employment opportunities for local residents by employing them as general or skilled laborers (as appropriate) on construction work crews.

4.28 REFERENCES

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3. *"Floodplains"* - Forsgren Associates, Inc.; West Yellowstone, MT - March 1994

4. *"US Highway 93 Hamilton to Lolo Air Quality"* - Timothy Krause, Shapiro & Associates; Seattle, WA - January 11, 1994

5. *"US Highway 93 Hamilton to Lolo Noise Study"* - Timothy Krause, Shapiro & Associates; Seattle, WA - January 11, 1994

6. *"Hazardous Material Assessment US Highway 93 Right-of-Way Corridor Hamilton to Lolo - Ravalli and Missoula Counties, Montana"* - Chen-Northern, Inc.; Helena, MT - November 1992

7. *"Biological Resources Report for Highway 93 Lolo to Hamilton"* - OEA Research, Inc.; Helena, MT - June 7, 1994

8. "*US Highway 93 Wetlands Evaluation*" - OEA Research, Inc.; Helena, MT - June 1994

9. *"The Significance of Deer Kill in Montana's Bitterroot Valley with Review of Preventative Measures"* - Robert Harris; Conner, MT - March 21, 1994

10. *"Social/Economic Report"* - Forsgren Associates, Inc.; West Yellowstone, MT - March 1994

11. *"The Bitterroot Futures Study"* - The Bitterroot Valley Chamber of Commerce and The Bitterroot Resource Conservation and Development Area, Inc.; Hamilton, MT - March 1993

12. *"RC&D Business Incubator - Business Plan"* and *"Planning Manual"* - Bitterroot Valley Chamber of Commerce and Bitterroot Resource Conservation and Development Area, Inc. (RC&D); Hamilton, MT - March 1993

13. *"Land Use Report"* - Forsgren Associates, Inc.; West Yellowstone, MT - March 1994

14. *"Ravalli County Comprehensive Plan"* - Ravalli County, Montana; Hamilton, MT - Draft April 1994

15. *"Farmland Impacts"* - Forsgren Associates, Inc.; West Yellowstone, MT - March 1994

16. "*US Highway 93 Traffic Study*" - Keller & Associates; Boise, ID - December 1993

17. *"Hamilton-Lolo Transportation Corridor Analysis"* - Peter Schauer Associates; Boonville, MO - January 7, 1994

18. Highway Capacity Manual, Special Report 209, Third Edition - Transportation Research Board, National Research Council; Washington, DC - 1994

19. MDT Design Guidelines - Montana Road Design Manual - Montana Department of Transportation; Helena, MT - April 1994

20. Multi-Lane Design Alternatives for Improving Suburban Highways, National Cooperative Research Program Report 282 - Transportation Research Board, National Research Council, March 1986

21. *"A Cultural Resource Inventory Report for the Proposed Lolo to Hamilton Transportation Improvement Project in Western Montana"* - Lynelle Peterson, Ethnoscience, Inc.; Billings, MT and Joan Brownell, Headwaters Cultural Resource; Bozeman, MT - November 1993

22. Letter from Stan Wilmoth, PhD to Jon Axline - MDT Environmental and Hazardous Waste Bureau; February 4, 1994

23. Letter from Jon Axline - MDT Environmental Services to Paul Putz - State Historic Preservation Office; October 16, 1995; concurrence noted by Montana SHPO, Stan Wilmoth, PhD, October 18, 1995

24. Letter from Jon Axline - MDT Environmental Services to Paul Putz - State Historic Preservation Office; October 23, 1995; concurrence noted by Montana SHPO, Stan Wilmoth, PhD, October 30, 1995

25. *"Energy and Commitment of Resources"* - Forsgren Associates, Inc.; West Yellowstone, MT - March 1994

CHAPTER 5.0

LIST OF PREPARERS

LIST OF PREPARERS

5.1 GENERAL

The Federal Highway Administration (FHWA) in cooperation with the Montana Department of Transportation (MDT) is responsible for preparation of this environmental document, including developing all conclusions and recommendations contained herein. Due to the scope of the project and the need to provide coordination among many project participants, MDT retained the consulting engineering firm of Forsgren Associates, Inc. (FA) to coordinate the study and preparation of this document with various agencies and interested parties and to administrate the efforts of the various professionals involved with in-depth studies.

Other federal and state agencies cooperated in the preparation of this document. Considerable guidance and assistance with regard to policy and decision making was also provided by a Citizen's Advisory Committee and an Interdisciplinary Team comprised of agency representatives. The sections that follow review the responsibilities and qualifications of all those participating in the preparation of this environmental document.

5.2 COOPERATING AGENCIES

The following agencies cooperated in the preparation of this document in accordance with NEPA guidelines:

- **US Department of Transportation, Federal Highway Administration**

  - Dale Paulson - Environmental Coordinator (406-441-1230)
    - BS - Civil Engineering
    - Registered Professional Engineer
    - 26 years experience in highway design construction and environmental coordination

- **Montana Department of Transportation**

  - Joel Marshik, P.E. - Manager, Environmental Services (406-444-7632)
  - Gary Gilmore, P.E. - Acting Administrator Highways Division (406-444-6200)
  - Carl S. Peil, P.E. - Preconstruction Engineer (406-444-6242)
  - R. Doug Morgan, P.E. - Assistant Preconstruction Engineer (406-444-6251)
  - Sam Naseem, P.E. - Consultant Design Engineer (406-444-6256)
  - Mark Leighton, P.E. - Consultant Design Section (406-444-6250)
  - James Weaver, P.E. - Missoula District Engineer (406-523-5800)

- **US Army Corps of Engineers**

  - Dwight Olson - Omaha Office (402-221-4628)
  - Robert McInerny - Helena Office (406-444-6670)

5.3 FEDERAL AND STATE AGENCIES

Other federal and state agencies assisting with directing environmental analysis and reviewing the resulting documents include:

- **US Fish and Wildlife Service**
  - Scott Jackson 406-449-5225

- **US Environmental Protection Agency**
  - Steve Potts 406-449-5486

- **US Soil Conservation Service**
  - John Blaine 406-329-3684

- **Montana Department of Fish, Wildlife, and Parks**
  - Dennis Workman 406-542-5507

- **Montana Department of Environmental Quality**
  - Tom Ellerhoff 406-444-3948

- **Montana State Historic Preservation Office**
  - Stan Wilmoth, Ph.D. 406-444-7715

5.4 CITIZEN'S ADVISORY COMMITTEE

The following members of the Citizen's Advisory Committee helped steer the study process and provided valuable input into the decision making process:

- Barbara Evans - Missoula County 406-721-5700
- Jerry Allen - Ravalli County 406-363-4790
- Tim Schwecke - Ravalli County Planning Office 406-363-2313
- Earl Kent - Bitterroot Chamber of Commerce 406-329-7625
- Bill Groff - Town of Victor 406-642-3455
- Marjorie Lubinski - Florence Civic Club 406-329-3743
- Brian Cherry - Bitterroot Greens 406-543-8623
- Audry Ebel - Town of Stevensville 406-777-5271
- Patricia Saindon - MDT Rail and Transit Division 406-444-3143
- Jim Weaver - MDT Missoula District Engineer 406-523-5800

5.5 INTERDISCIPLINARY TEAM

Representatives of key cooperating agencies were invited to participate on an "interdisciplinary" team to facilitate early and thorough coordination in the environmental review process. Members of the Interdisciplinary team are:

Agency	Representative	Phone
Montana Dept of Fish, Wildlife & Parks	Dennis Workman	406-542-5507
State Historic Preservation Office	Stan Wilmoth	406-444-7715
US Army Corps of Engineers (Helena)	Mr. Robert McInerney	406-444-6670
US Army Corps of Engineers (Omaha)	Dwight Olson	402-221-4628
Soil Conservation Service	John Blaine	406-329-3684
Federal Highway Administration	Dale Paulson	406-441-1230
US Fish and Wildlife Service	Scott Jackson	406-449-5225
US Environmental Protection Agency	Steve Potts	406-449-5486
Montana Department of Environmental Quality	Tom Ellerhoff	406-444-3948
Montana Department of Transportation	Julie Glavin	406-444-0802
Forsgren Associates, Inc. (consulting firm)	Winston R. Dyer, P.E.	800-331-7548

5.6 CONSULTANT

Forsgren Associates assumed responsibility for project management, project coordination, and preparation of the EIS. Subconsultants assisting FA are listed in the next section.

♦ Forsgren Associates, Inc. (800-331-7548)

- Winston Dyer, P.E. - Project Manager
  - ME - Civil Engineering
  - Registered Professional Engineer in 5 States
  - 17 years experience in transportation engineering including design, environmental analysis, and project management

- John W. Millar, P.E. - Engineering Consultation
  - ME - Civil Engineering
  - Registered Professional Engineer
  - 22 years experience in highway design, materials testing, foundation engineering, municipal engineering, and quality control assurance experience

- Vance B. Forsgren, P.E. - Engineering Consultation
  - MS - Civil Engineering
  - Registered Professional Engineer
  - 15 years experience in roadway design, sanitary and storm sewer analysis, hydraulic structure design, computer modeling, and simulation and structural design

- Don Mecham, P.E. - Geometric Design
  - BS - Civil Engineering
  - Registered Professional Engineer
  - 35 years experience in design, traffic engineering, construction engineering, and maintenance engineering

- Alan S. Giesbrecht, E.I.T. - Preparation of Various Substudies
- Nicholas Miseirvitch,E.I.T. - Hydraulic Analysis and Roadway Design
- Ken Petty - Preliminary Design and Technical Support
- Glenn Halverson - Preliminary Design and Technical Support
- Bryce W. Millar - Computer Applications and Modeling of Alternatives
- Christine Miltenberger - Graphics and Public Participation
- Brad Liljenquist - Graphics and Presentation Material
- Cynthia Hansen - Word Processing and Report Preparation

5.7 SUBCONSULTANTS

Subcontractors retained by FA to provide detailed study and necessary expertise in many areas of environmental analysis, transportation engineering, and public involvement include:

♦ OEA Research, Inc. 406-443-5560
Wetlands and Biological Analysis

- Pam Hackley
  - MS - Forestry-Soils, ABT, 1985
  - BA - Biology, 1975
  - Project Manager - Wetlands

- Lisa Fairman
  - BS - Forestry-Range Management, 1986
  - BS - Wildlife Biology, 1987
  - Wildlife - Threatened, Endangered and Sensitive Species, Wetlands

- Ginger Thomas
  - MS - Wildlife Biology, aquatic option, 1985
  - BA - Geography, 1979 (with distinction)
  - Fisheries and Aquatics

♦ Ethnoscience 406-252-7945
Cultural and Historic Resources

- Ken Deaver
  - PhD - Anthropology, 1978
  - Extensive experience in Montana archaeology

- Sherri Deaver
  - PhD - 1975
  - Has worked on all 7 reservations in Montana

- Lynelle A. Peterson
    - * MA - Anthropology, 1986
    - * Extensive work within the northern plains

- Joan Brownell
    - * MA - History, 1987
    - * Numerous historic investigations in Montana, North Dakota, Nebraska, Virginia, South Dakota, Minnesota, and Idaho

♦ **Huntingdon Engineering and Environmental (formerly Chen-Northern)** 406-443-5210
Hazardous Waste

- Daphne Digrindas
    - * BA - Geology, 1979
    - * Environmental Site Assessment Program Manager

- Kim Medina-Olsen
    - * BS - Geology, 1982
    - * Environmental Scientist

- Mitchell Paulson
    - * AD - Commercial Art Technical Institute, 1974
    - * College of Art and Design, 1975

♦ **Shapiro and Associates, Inc.** 206-624-9190
Noise and Air Quality

- Tim Krause
    - * JD - Environmental Law
    - * MS - Environmental Systems Engineering
    - * BS - Environmental Sciences

♦ **Armstrong and Associates** 406-449-4669
Soils and Geotechnical

- Joe Armstrong, P.G.
    - * BA - Geology, 1959
    - * Registered Professional Engineer - Geology

♦ **McGee & Company** 406-628-7703
Surveying and Mapping, Traffic Survey

- Dan McGee, L.S.
    - * BS - Arts and Sciences, 1969
    - * Graduate study in Hydrogeology
    - * Registered Professional Land Surveyor, Montana, Wyoming, North Dakota

- **<u>Keller and Associates</u>** 208-375-1992
  Traffic Study

  - Don Gray
    - Civil Engineering Technician
    - Associate in Surveying
    - Institute of Traffic Studies

- **<u>Peter Schauer Associates</u>** 816-882-7388
  Transportation Demand Management Study, Traffic and Telephone Studies

  - Peter M. Schauer
    - MRP - Regional Planning
    - MA - Communication
    - BS - Agriculture
    - 14 years experience transportation planning and demand management

- **<u>Dr. Joe Floyd</u>** 406-657-2994
  Telephone and Traffic Surveys, Public Meeting Facilitation

  - Joe Floyd
    - PhD - Sociology, 1977
    - 16 years teaching as Professor Sociology
    - has been invovled in numerous survey reach studies, focus group activies, public meetings, and evaluation research

- **<u>Clancy Consultants, Inc.</u>** 406-252-6120
  Public Meeting Facilitation

  - Ann L. Clancy
    - Designed and facilitated numerous public hearings
    - implemented numerous company-wide organizational changes
    - PhD in Organization Development

- **<u>Turnstone Biological</u>** 406-821-3813
  Deer Kill Study

  - Robert S. Harris
    - BS - Wildlife Management, 1971
    - BS - Fisheries Biology, 1971
    - Associate - Science, 1969

- **<u>Terra West, Inc.</u>** 406-933-5641
  Global Positioning Mapping of Wetland Areas

  - Don Cromer

CHAPTER 6.0

ENVIRONMENTAL DOCUMENT CIRCULATION

ENVIRONMENTAL DOCUMENT CIRCULATION

6.1 GENERAL

The following is information listing the agencies, interest groups, and individuals to whom this environmental document is being made available for review. Additionally, notification is being given of the document availability to everyone on the current mailing list (at present 989 names), which includes adjacent property owners, interested citizens, special interest groups, local governments and civic organizations, and interested state and federal agencies.

Copies of the document will be distributed free of charge to those requesting it and additional copies are being made available for public inspection at publicly accessible information depositories at eight locations in or near the project corridor.

Document availability will also be announced via local public media.

6.2 STATE AND FEDERAL AGENCIES

Pat Graham, Director
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6.5 INTERESTED OR AFFECTED INDIVIDUALS

To be completed when requests for DEIS are made.

U.S. Highway 93
HAMILTON TO LOLO
ENVIRONMENTAL IMPACT STATEMENT

CHAPTER 7.0

COMMENTS AND COORDINATION

COMMENTS, COORDINATION, AND ISSUES

7.1 INTRODUCTION

This Chapter presents information concerning efforts to coordinate with interested and regulatory agencies, assure that the public is involved in the planning process, and invite the public to actively participate in determining the recommendations of the study. While transportation officials usually do an adequate job of transportation planning, it is the end users of facilities and those who live close by who have the greater understanding of local conditions and a better feel for feasibility and acceptability of proposed solutions. Getting a broader perspective of the needs and solutions through participation of agencies and involvement with the public produces a better final product.

A Public Involvement Plan[1] was developed to assure adequate participation by agencies and the public in the study and planning processes. The Plan recognized that the environmentally sensitive nature of the transportation corridor, coupled with keen public interest in proposals for transportation improvements, demanded careful attention to development and implementation of a thorough public involvement program.

Information reported in this Chapter summarizes the elements of the program and items brought to light through efforts at getting this greater involvement. Accordingly, the information that follows reviews public involvement efforts and reports on input, issues, and results where appropriate. Some of the more major elements (e.g. telephone and traffic surveys) have specific reports presenting in detail the methodologies and findings of the efforts, which reports may be consulted for those desiring further specific information beyond the general summary presented here.

A. AGENCY COORDINATION

7.2 COOPERATING AGENCIES/EARLY COORDINATION

Anticipating which environmental impacts were likely to be more sensitive or perhaps of greater extent than others led MDT to invite the Army Corps of Engineers (COE), the Montana Department of Natural Resources and Conservation (DNRC), and the Montana Department of Fish, Wildlife and Parks to become cooperating agencies in the study effort. The concept allows for early coordination between the agencies with special attention to critical environmental considerations, regulations, permit requirements, and other important project factors needing thorough treatment prior to project development. It also allows building compromise and settling differences where conflicts in regulations or objectives may exist between agencies.

Of those solicited, the COE accepted the invitation to become a cooperating agency based on the anticipated extent of impacts to wetlands and waters of the United States potentially associated with "build" alternatives within the project corridor. The COE has extensive public involvement and permit requirements (see 404(b)(1) evaluation [Appendix C]) associated with wetland impacts and it only makes sense to cooperate during the study and public involvement phases to meet the requirements of all the agencies involved. The DNRC is also considering becoming a cooperating agency.

The process has worked very well. Letters and memorandums were exchanged early in the project outlining responsibilities, required information gathering, desired public involvement efforts, and other factors to assure thorough treatment during project development and approvable conclusions and recommendations of this environmental document. The coordination is on-going and is expected to continue through the design and implementation stages.

7.3 INTERDISCIPLINARY TEAM

In a similar fashion, a team of representatives from various regulatory and interested agencies was assembled early in the study process to achieve similar objectives as described in the foregoing section. The function of the Interdisciplinary Team (ID Team) was to review the various and perhaps conflicting requirements from each of the agencies relative to project development, and also provide the opportunity for early review of project issues. An additional benefit is the opportunity to understand the steps necessary to satisfy agency requirements in terms of the final proposal.

Members of the ID Team are listed in section 5.5. The team has met on several occasions and will continue to meet as often as necessary to properly coordinate and thoroughly evaluate project issues. Significant issues raised by ID Team members to date have been included in the discussions presented in this environmental document and their future input will continue to be included in the document or project development process, as appropriate.

For example, the conclusion of mitigation recommendations in early wetland evaluation reports were very broad and fairly generic. ID Team members insisted on having details of more specific mitigation plans in order to better evaluate the potential impacts. The requested information is discussed in the appropriate sections of this document in direct response to those requests. Involvement of the ID Team has done much to improve the proposal and minimize or avoid potential impacts.

7.4 NOTICE OF INTENT

A Notice of Intent[2] was submitted by the Federal Highway Administration (FHwA) and published in the Federal Register on September 17, 1992. The purpose of the notice was to alert federal and other interested agencies of the proposal to study potential improvements to transportation in the Hamilton to Lolo corridor and offer them the opportunity to participate or receive additional information in regard to on-going study efforts.

7.5 LETTER OF INTENT

Similarly, an individual Letter of Intent[3] was mailed on November 27, 1992 to all , agencies that might have interest in or jurisdiction for the project. The letter described the intent to study the corridor, gave a map delineating project limits, and requested input on the proposed project and regulations that may impact the proposal.

7.6 404 PERMIT COORDINATION

Section 404 of the *Clean Water Act* regulates the proposed discharge of dredged or fill materials into wetlands and waters of the United States, including floodplain areas. The COE is the regulatory agency and administrates the regulations through a permit process requiring extensive analysis and review of possible alternatives to eliminate or minimize the resulting impacts on these areas. Consequently, a 404(b)(1) evaluation was completed (see Appendix C) providing the information necessary to obtain 404 permit(s) associated with proposed improvements. Early coordination with COE and joint efforts at public involvement have streamlined and facilitated the permit development process.

7.7 INTERAGENCY WETLANDS COORDINATION

As soon as it was determined there was a potential for significant wetlands involvement with "build" alternatives, coordination began among those agencies responsible for regulating and protecting these areas. In Montana, an Interagency Group has been formed comprised of agency representatives charged with overseeing and regulating wetland areas. The Interagency Group meets monthly in Helena to review common issues, coordinate regulatory requirements, and otherwise keep abreast of on-going developments in projects statewide that have the potential to impact wetland areas.

As a member of the group, representatives of MDT's Environmental Section have provided information on a continual basis regarding the potential for wetlands impacts in the Hamilton to Lolo corridor. Additionally, the Consultant's project manager made specific, formal presentations to the group on May 15, 1994 and again on April 27, 1995. The first meeting provided project background and information on anticipated impacts; the second meeting reported on specific planned mitigation efforts to avoid, minimize, and mitigate wetland impacts. Members of the Interagency Group will continue to review proposals and specific design details to assure these objectives are realized.

7.8 TRIBAL COORDINATION

The Historical Background Section (Section 3.18) described significant native american involvement in the project area historically, and the continued interest of these groups in historical and cultural resources remaining in the area. General contact by MDT's Environmental Section with tribal groups was made early in the project development process, followed by specific contact from the subconsultant hired to study cultural resources. Contact was made with representatives of the cultural committees for the Confederated Salish and Kootenai tribes. On-going coordination with respect to specific cultural resource sites is continuing through MDT's Environmental Section. Copies of this environmental document are also being provided to these groups to encourage further participation.

7.9 GENERAL CORRESPONDENCE

Opportunities for coordination and involvement with other groups and agencies have also been provided. Information received from all agencies, groups, and individuals to date has been incorporated in this environmental document. The following is a partial listing of entities from which input was requested.

- Local Governments
- Civic Leaders
- Tribal Groups
- Bureau of Reclamation
- U.S. Forest Service
- National Park Service
- U.S. Department of Interior
- Montana Natural Heritage Program
- Montana Fish, Wildlife & Parks Planning Bureau
- Montana Audubon Council
- Montana Nature Conservancy
- American Wilderness Alliance
- Sierra Club
- Federal Aviation Administration
- Montana Rail Link
- Montana Department of State Lands
- Montana Department of Natural Resources & Conservation
- Montana Wildlife Federation

7.10 PRELIMINARY DRAFT EIS CIRCULATION

A preliminary edition of this Draft EIS was prepared and circulated to the principal regulatory and interested agencies for review and comment. Agencies were asked to review the document for accuracy, completeness, and compliance with regulations. Invitation was also extended to comment on conclusions and recommendations. Several agencies responded and their comments and concerns have been appropriately addressed and included in this environmental document as it currently stands. Copies of the input letters are presented in Appendix D along with specific responses to the comments where appropriate.

The following is a list of the agencies responding:

- US Environmental Protection Agency Region VIII - Montana Office
- US Fish and Wildlife Service
- Federal Highway Administration
- US Army Corps of Engineers
- US Soil Conservation Service
- Montana Dept of Fish, Wildlife and Parks
- Montana Dept of Environmental Quality - Air Quality Division
- Montana Dept of Environmental Quality - Water Quality Division
- Montana Dept of Transportation
- State Historic Preservation Office (Montana)

B. PUBLIC INVOLVEMENT

7.11 CITIZENS ADVISORY COMMITTEE

A Citizens Advisory Committee was organized consisting of local government leaders and representatives from groups or organizations reflecting the interests of citizens within the project area. Invitation was extended to these various groups to name their own representative to the Committee. A listing of members of the Advisory Committee is presented in Section 5.4.

The function of the Committee was to help focus on issues that are significant and important to the public. Committee members helped with disseminating information to the public, participating in public scoping meetings, and assisting in the public hearing process. This level of involvement naturally allowed Committee members to bring public input back to those responsible for conducting the studies and preparing this environmental document. A special charge to the Committee was to assist in the development of project alternatives and to evaluate recommendations for the preferred alternative as contained herein.

The Committee met on numerous occasions to review project status, results of studies, proposed solutions, and otherwise provide input to the study process. The Committee will continue to function through the remainder of the study and design processes and perhaps even into construction in order to provide a voice for public concerns about the development and implementation of the project.

An excellent example of the functioning of the Committee is the Silver Bridge realignment. The Project Manager had submitted a small study of four realignment alternatives to the Committee. Input given by the Committee challenged several assumptions, pointed out additional impacts that needed to be addressed, and suggested changes to the proposal in order to provide greater protection to local businesses and lessen

impacts on the local environment. All of these objectives were achieved in the final alignment shown in this document, which represents a significant improvement over original proposals.

Special thanks and appreciation is expressed to Advisory Committee members for the selfless service and countless hours volunteered in reviewing project information, keeping a finger on the public pulse, and providing recommendations for improvements arising from the myriad of studies and other information gathered in this planning process.

7.12 LETTER OF INTENT

A Letter of Intent[3] was mailed to property owners, agencies, and other interested parties on November 27, 1992. The letter described the intent to study the corridor, gave a map delineating project limits, and requested input on the proposed project or other development projects that may be impacted by the proposal. Approximately 550 letters were mailed out and responses received were incorporated into the study process as appropriate. The effort was extremely helpful in discovering plans for future development and properly coordinating those with proposals for transportation improvements in the study corridor.

7.13 MAILING LIST

Three separate mailing lists were computer-compiled and continually updated and maintained for this project:

- Agencies and Organizations
- Property Owners
- Other Interested Parties

The purpose of the lists was to assure thorough dissemination of information regarding the project to the public as well as providing notification of opportunities for public participation.

Currently, the combined total of the lists is nearly 1000 names. Those voluntarily returning their name on the traffic survey forms were added to the list as well as those signing in at public scoping meetings. Numerous opportunities have been advertised at public meetings and in distributed project information for persons to be added to the list. Those reading this section and desiring to be included on the list may call 800-331-7548 during normal business hours to be placed on the list.

7.14 MEDIA COORDINATION

The objective of this public involvement item was to spread project information as far as possible. Facets of this element included the following:

- written and oral news releases
- meetings with community groups, clubs, and organizations
- television and radio interviews
- television, radio, and newspaper advertising
- news coverage of public meetings

Fortunately media support for covering and announcing project information was excellent, resulting from the keen interest in the project by area residents. Newspaper articles and television and radio news spots helped disseminate information to those not able or desiring to attend the public scoping meetings. Thorough

advertisement of meetings and other public participation opportunities were made through use of the news media. Greater public involvement and input was received at the meetings as a result of media efforts to "spread the word" in advance and encouraging the public to become involved.

7.15 NEWSLETTERS

Two newsletters were published during the development of this document and were mailed to those who were on the mailing lists at the time of publication. The first newsletter[4] was sent out prior to the 3rd set of public scoping meetings to report on the findings of studies conducted to date, educate the public with regard to potential alternatives, and provide a general invitation to all to become involved in the project and associated public meetings. The four page newsletter contained highlights of all important project information as well as addresses and phone numbers to contact for further information. Distribution of the newsletter did much to encourage public involvement in the 3rd series of public scoping meetings.

A second newsletter was published to announce distribution of this Draft Environmental Impact Statement. It summarized project information and status, reported on findings and recommendations, announced the availability of this document, and established dates, times and locations for the public hearings to be held on this project.

7.16 COMMUNITY GROUP COORDINATION

Efforts to involve the public in the planning process created a high degree of interest and keen awareness of discussion on issues and alternatives on the part of local community and civic groups. In an effort to increase awareness, pass information onto the public, and be a greater part of the planning process, several community and civic groups extended invitations to project personnel or knowledgeable third parties to make presentations regarding the project in their group meetings.

Specific presentations were made to the Ravalli County Planning Board, the Hamilton Chamber of Commerce, the Bitterroot Chamber of Commerce, and other civic groups in the Bitterroot Valley. These efforts were successful in disseminating project information and stimulating questions and discussions that produced valuable input on issues and alternatives.

7.17 INFORMATION DEPOSITORIES

Public libraries, community centers, and other focal points of community involvement were set up as information depositories where copies of studies and project documents could be located for use and reference by the general public. Eight such locations were established in and beyond the project corridor:

- Bitterroot Public Library; 306 State; Hamilton
- North Valley Public Library; 208 Main; Stevensville
- Missoula Public Library; 301 E Main; Missoula
- Lolo School; 11395 Hwy 93 S; Lolo
- Farmers State Bank; 103 Main Street; Victor
- Corvallis Drug; 1029 Main; Corvallis
- Farmers State Bank; 5501 Old Hwy 93; Florence
- Darby City Hall; 101 E Tanner; Darby

Documents in the depositories were coded by number to an index sheet to assist in referencing the material. Information was updated regularly as new reports and data became available. Use of the information

depositories will continue until such time as a record of decision has been made on the proposals and the public has had sufficient time to review that record after placement in the depositories.

C. PUBLIC PARTICIPATION

7.18 TOLL-FREE HOTLINE (800-331-7548)

Opportunity was provided to all persons, agencies, and groups to receive project information, have questions answered, give input, or otherwise express concerns or opinions to the project manager. This was made available through a toll-free public number liberally published in meeting advertisements, mailings, important publications, and other project documents as well as being distributed by announcement and business card at all public meetings. Use of the hotline will continue through completion of the study process and on into design.

The telephone number served an important function in being able to obtain information regarding proposed developments and potential impacts that might not otherwise have been known. Many availed themselves of the opportunity to receive information and have questions answered. Perhaps the most frequent use was to have names added to the mailing list to assure proper notification of upcoming project meetings.

7.19 TRAFFIC SURVEY

A traffic survey[5] was conducted in July 1992, which included stopping approximately every other car on US Highway 93 at a location near the Missoula County/Ravalli County line for the space of 12 hours. Of those that where stopped, all vehicles received a postage-paid written survey form to fill out and mail in to the project manager. Additionally, verbal questions about US 93 conditions, perceived problems, ideas for solutions, and travel preferences were asked of every other driver in addition to their receiving the written survey form.

Response to the survey was incredible. The vast majority of those interviewed were very cooperative and willingly gave verbal input (the process took approximately 60 seconds). The response to the written survey form was overwhelming. Past experience would indicate a return of 6 to 10 percent of the survey forms could be expected. Within a month after the survey, 1118 written response of 2000 forms distributed (56%) had been received back, showing a keen public interest in this study.

Results of the traffic survey information have been tabulated and a brief statistical report[5] was issued on the process and results. Pertinent information from that survey has already been presented in Sections 1.7, 3.17, and 4.17. Some brief highlights of the report are as follows:

- vehicle information (type, number of passengers, license plate, time of day, etc.)
- characteristics and preferences of drivers (age, gender, income, location of residence, etc.)
- characteristics of travel (origin, destination, purpose of trip, frequency of travel, time of travel, etc.)
- list of issues and problems affecting transportation in the corridor
- list of ideas and recommendations for transportation improvements in the corridor
- 82% of vehicles had only 1 occupant and primary purpose was for commuting or work related travel
- 42% of drivers had changed travel plans at one time to avoid "too much traffic" or "rush hours"
- most frequently mentioned problems: excess traffic, lack of turning lanes, narrow road, and animal collisions
- most frequently recommended solutions: additional lanes, turning lanes, and public transportation

7.20 TELEPHONE SURVEY

A telephone survey[6] was conducted on Super Bowl Sunday in January 1993. In this study 1151 area telephone numbers were selected at random from a Bitterroot Valley phonebook in order to complete 354 interviews. Whereas the traffic survey had obtained information from those using the highway, the telephone survey was an attempt to receive information from all residents, including those who may not be frequent users of the highway.

A particular set of questions in the telephone survey were specifically oriented to discovering potential support for alternative modes of transportation such as car pools, bus systems, and commuter rail service. Other questions were oriented toward characteristics of highway users and travel, issues and problems that need consideration, possible solutions, and general attitudes of support toward various possibilities.

Some results from the telephone survey are discussed in Sections 1.7, 3.17, and 4.17 where specific discussion on important conclusions is presented. Information gleaned from the survey includes:

- respondent information (location, gender, age, income, eduction, length of residency, etc.)
- travel information (frequency of use, travel patterns, origin and destination, purpose, work schedules, parking availability, commute characteristics, etc.)
- alternative transportation (attitude, support, means of encouragement, etc.)
- 61% might consider alternative means of commuting
- 79% think a commuter rail system may be a good idea that might work, but only half would use it more than once per week
- 59% feel traffic on US 93 is "annoying" or "intolerable"
- 72% feel safety is a major issue
- most common problems: too much traffic (66%), animals (54%), reckless driving 47%), and lack of public transportation (47%)
- most frequent solutions: additional lanes (83%), turn lanes (64%), rail service (47%), car pooling (47%), and bus service (45%)

7.21 FOCUS GROUPS

As part of the investigation of transportation demand management (TDM) alternatives (methods of reducing traffic on the highway), focus groups[7] were formed to try and identify those methods that would be best supported and their most practical means for implementation. Specifically, participants were:

- presented with a list of TDM alternatives for group discussion
- asked to distinguish strategies that would work and those that would not
- asked how to get people to use the ways that would work
- asked to suggest to public information campaigns about TDMs that have been used elsewhere
- asked what they had learned or changed in their thinking as a result of participation in the focus group

Seven focus group sessions were held including four comprised of general citizens randomly selected by computer from the area telephone book; two sessions for local civic leaders; and one session for a special interest group keenly interested in traffic reduction. In general, the groups were formed with seven to 15 persons. The reaction of the focus groups was very positive and some interesting observations were gained from the efforts. Generally, participants thought the meetings were useful and a rewarding experience. Many were excited for the opportunity to give input and realized that people do have good ideas to be shared on improving transportation.

Of the 83 people participating the focus groups, the following represents the most popular TDM alternatives. The number in parenthesis indicates the number of individuals selecting the item out of all those participating.

- mass transit (42), including 8 who specifically mentioned a train and 3 who mentioned a bus on rails
- carpooling (38), usually mentioned in conjunction with park-and-ride lots
- employer related activities (31), such as work hour adjustments, special carpool parking areas, etc.
- park-and-ride lots (30)
- education and information about TDM techniques, park-and-ride lots, carpooling, etc. (17)
- enforcement of slow driver laws along with educational campaign to encourage slow drivers to use turnouts (9)
- bus children to Lolo school (7)

Many other techniques were also discussed ranging from such items as tax incentives for employers encouraging TDM, to placing horses and bicycles on trains, to the concept of telecommuting and shopping locally. Although the groups indicated some frustration over the lack of public education regarding these possibilities, enthusiasm was expressed that options are available and a greater public awareness of these concepts should bring corresponding improvements to the traffic congestion problem.

7.22 PROPERTY OWNER CONTACTS

Names of all current property owners were obtained from the County Tax Records. Names were entered on the mailing list and written information was sent to the property owners including the letter of intent, newsletters, and announcements of public meetings. Individual contacts were made with nearly all property owners via telephone and sometimes in person for the purpose of introducing the study and obtaining permission to enter private property while conducting environmental review work.

Several having specific concerns regarding the project have contacted the project manager for consultation. Several other property owners with unique situations or special concerns were personally visited or contacted by the project manager for the purpose of providing information and receiving specific input. Use of the toll-free hotline presently continues and will continue throughout the planning and design processes to facilitate individual property owner contacts.

Lastly, if improvement alternatives are recommended and approved, property owners will be individually visited on-site to review design drawings, discuss impacts, right-of-way needs and approaches, and have the opportunity to give further specific input.

7.23 PUBLIC SCOPING MEETINGS

The main thrust of public participation was provided through the use of a series of public scoping meetings. Similar to a telescope helping to see and understand distant objects more clearly, "scoping" is a process whereby transportation planners can interact with local residents and interested parties to "identify" the issues related to transportation needs and potential improvements. The public also has the opportunity through the process to better understand the requirements and regulations associated with transportation planning and the implementation of potential improvements.

A series of three sets of scoping meetings were held at different points in the study process to focus on identification of project issues, develop potential alternatives, and report on the results of environmental studies, respectively. Each of the three sets of scoping meetings consisted of three individual meetings at different times and different locations within the project corridor in an effort to be more convenient and closer to persons affected by the project. Meeting times alternated between evenings and afternoons to provide opportunity for participation by people with various schedules. The same information was discussed at each meeting for a given "set" of scoping meetings. Table 7-1 reviews the meeting dates, times, location, and attendance.

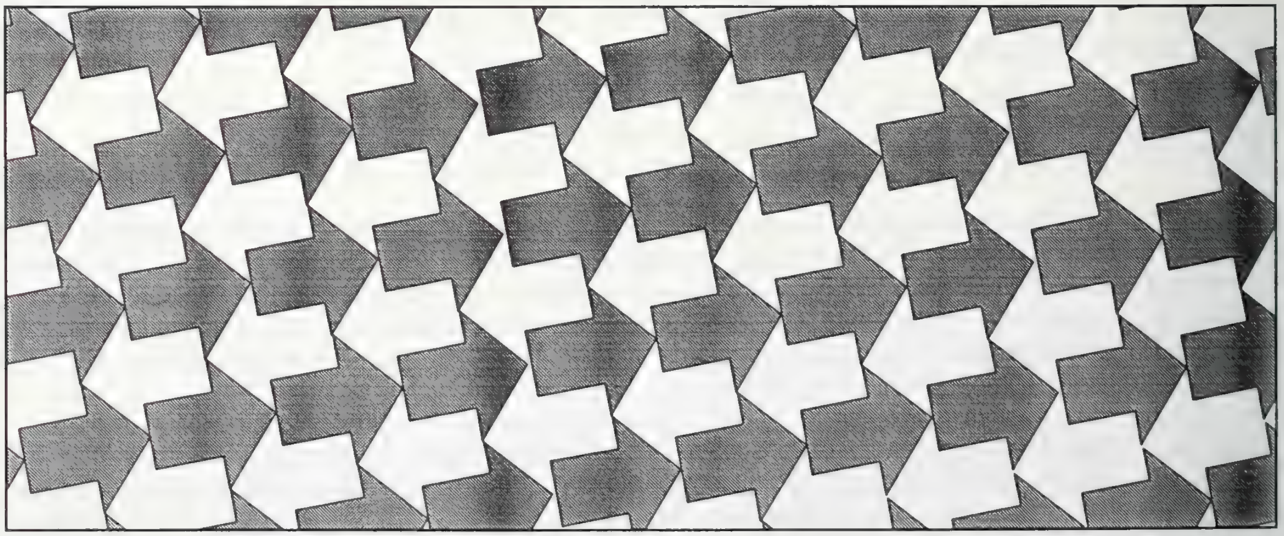
TABLE 7-1
PROJECT SCOPING MEETINGS

Purpose	Date	Time	Location	Attendance
1st Set Identification of Issues	Dec 1, 1992 Dec 2, 1992 Dec 2, 1992	6:00-9:00 pm 2:00-5:00 pm 6:00-9:00 pm	Stevensville Florence Victor	17 28 52 total 97
2nd Set Development of Alternatives	April 21, 1993 April 22, 1993 April 22, 1993	6:00-9:00 pm 1:00-4:00 pm 6:00-9:00 pm	Lolo Stevensville Hamilton	35 51 92 total 178
3rd Set Presentation of Results	March 23, 1994 March 24, 1994 March 24, 1994	7:00-9:00 pm 2:00-4:00 pm 7:00-9:00 pm	Florence Victor Hamilton	43 47 43 total 133

The meetings were advertized in all local newspapers as well as through verbal public service announcements on all local radio stations. Flyers announcing the meetings were posted in prominent public locations throughout the project corridor, including post offices, shopping centers, community centers, libraries, etc. Personal notification was sent to everyone on the project mailing list which includes property owners, agencies, interested parties, and those who attended previous meetings. Figure 7-1 is an example of a visual developed to attract public attention to one of the meeting announcement flyers.

FIGURE 7-1
SCOPING MEETING ADVERTISEMENT

THERE'S MORE THAN ONE WAY OF LOOKING AT THINGS, RIGHT?



HERE'S A CHANCE FOR US TO TALK TOGETHER ABOUT HOW IT SHOULD BE.

Common to all meetings were:

- introduction by the project manager
- handouts of material including meeting agenda, maps, project data, results of studies, etc.
- opportunities for public interaction
- chance to have questions answered and concerns addressed
- opportunity to give oral and/or written input
- chance to meet informally with project representatives and the experts who conducted environmental studies
- chance to request specific project information and to be included on project mailing list

The following subsections provide more specific descriptions of each of the "sets" of scoping meetings. Information received on project issues and comments on alternatives are presented in Article 7.25.

1st Set of Public Scoping Meetings: The purpose of these meetings was basically to acquaint the public with the study being conducted, provide information to the public, and receive input concerning issues or concerns related to transportation in the corridor. After a presentation by the project manager reviewing the basic information with the public, the meeting was broken up into small groups (4 to 5 individuals) meeting one-on-one with representatives of the consultant and MDT. Individuals were given the opportunity to comment concerning issues or concerns on transportation in the corridor.

Most of the input centered around potential impacts to individual properties (a large number of property owners along the highway were present), and significant input was gained on project issues and other items of importance to the study, including initial ideas at potential alternatives for improvements. The information provided was most valuable in helping focus study efforts on significant issues and spend less time on less important issues.

2nd Set of Public Scoping Meetings: The primary purpose of the second set of scoping meetings was to try and generate a more refined list of potential project alternatives and confirm with the public the major project issues identified through oral and written input from the first set of scoping meetings. Information was given on project status and the opportunity was given for participants to have questions answered and express thoughts and concerns over project issues and potential impacts.

The meeting format was set-up to facilitate and allow maximum participation by those in attendance. The "nominal group technique" participation method was employed, which utilizes small groups to allow each individual positive input into the process. The meeting began with individuals seated at tables in small groups and the project manager giving a brief presentation on the status of the project, objectives of the study, and a summary of issues identified through the first set of scoping meetings. The small groups were given time to discuss among themselves what they had heard in the presentation and to write down questions individuals had concerning the project. Each small group was then given the opportunity to present this information to all present, and the questions raised were answered publicly by the project manager.

Next the small groups reconvened allowing each individual the opportunity to express his or her ideas concerning the best possible ways to improve transportation in the corridor. Each small group selected a leader who led a discussion within the group to prioritize all of the ideas presented by the individuals, narrowing them down to the top three priorities to be presented to the total audience. After those presentations, the project manager and meeting facilitators led a brief discussion of similarities among the reports from the different groups as a further effort to identify consensus.

Participants in the meeting felt good about the process and the specific opportunity to give input and share knowledge. Strong consensus was reached in the Lolo meeting for public transit alternatives, while interest in both highway improvements and transit options came forth in the other two sessions.

Media coverage of the meetings was favorable with news articles and television interviews further attracting public interest in the project. A report was prepared summarizing all of the comments received during this second set of public scoping meetings.

3rd Set of Public Scoping Meetings: The third set of public scoping meetings focused primarily on reporting the results of the many individual environmental studies conducted in the corridor and the specific impacts related to alternatives that had been identified to date. Additionally, opportunity was taken to confirm with the public the project issues and the range of alternatives as developed from the previous two sets of scoping meetings.

The meetings began with a half hour "open house" where individuals where allowed the opportunity to acquaint themselves with project related information on an informal basis. This was done by being able to visit individual "stations" around the meeting room where information was available on the following specific topics:

- project background
- traffic
- public involvement
- wetlands and wildlife
- transportation demand management
- physical environment
- biological environment
- human environment

Information was presented with charts, graphs, and other visual displays. In most cases the experts who had conducted the individual studies were present to explain the information and answer questions.

Following the initial open house, a brief presentation was given by the project manager reviewing the project status and presenting the basic results of the environmental studies conducted to date. Additionally, a discussion was held concerning the "consensus" that was being developed on project issues and alternatives through previous public participation efforts. Opportunity was then given to have questions answered.

The remainder of the meeting went back to the "open house" format affording participants the opportunity to talk directly with the experts who conducted the environmental studies and give public input to project representatives. Many expressed appreciation over the thoroughness of the effort and information presented, as well as the opportunity to have their questions answered and give additional input.

7.24 RESPONSIVENESS SUMMARIES

Each time a public meeting was held (after the 1st series), a portion of the presentation contained a "responsiveness summary". The purpose was to report back to the public what had been heard at previous meetings and what had been done with or about the input received. This was particularly valuable in reporting on project issues and receiving confirmation and consensus from the general public that the "statement of issues" was correct. Similarly, the development of alternatives was also solidified through this process. This effort provided the public assurance that not only was input being heard, but more importantly it was being taken into account in the study process and the development of proposals for improvements.

7.25 PROJECT ISSUES AND COMMENTS ON ALTERNATIVES

After the first set of scoping meetings, verbal input and written forms were reviewed to identify all project issues and prioritize them in order of the number of comments received on the issues. Discussions where

then undertaken with the Advisory Committee, Interdisciplinary Team, and regulatory agencies concerning this input. Results of the prioritization were shared with the public at the second public scoping meeting as part of the public presentation. Although the process of identifying significant issues was made as objectively as possible, some judgement factors were used in the screening process:

- number of comments received on the issue
- agency requirements to address or give attention to a specific issue
- strength of convictions in comments received
- impact of issues on previous similar projects

The information that follows will present the significant issues identified and confirmed with the public through the foregoing process:

Problems
Speeding/reckless driving
Traffic congestion
Safety concerns
Growth and land use
Realignment/replacement of Silver Bridge
Excessive backup on Woodside cutoff
Control of strip development

Environmental Concerns
Deer crossings/accidents
Air quality preservation/enhancement
Improving roadway may lower quality of life
Noise levels and abatement
Threatened and endangered species
Floodplain impacts

Recommended Actions
Look at 4 lane options
Do something soon
Look at public transportation system (rail or bus)
Look at transportation demand management techniques (park and ride, carpooling, etc.)
Provide turning lanes
Accommodate bicycles
Look at 2 lane option with added passing lanes or 3 lane option
Educate public on public transportation and driving habits
Look at 5 lane option
Consider limited access

Input received was very valuable in focusing environmental study efforts. For example, the intensity of the deer kill issue led to commission of a specific study to identify the scope of the problem ($700,000 annual property damage in the Valley!!), and possible mitigation. Similarly, the alternatives were able to be organized under the three main categories of "no build", "build", and alternate alignments.

The second set of public scoping meetings worked very well to confirm project issues with the public and screen the alternatives down to those considered most promising for implementation. Highlights of issues and comments received from the second series of public scoping meetings follows:

- Most people felt the issues and their priority of emphasis (resulting from the first series of public scoping meetings) were comprehensive and correctly stated.

- Meeting participants were very pleased with the opportunity to have meaningful input into the project and study process and encouragement was given to continue public participation efforts. However, some were skeptical of the process, feeling that there may be a foregone conclusion and that public participation efforts may not be genuine. This indicated a need to build public trust and improve public relations.

- Additional concerns were expressed concerning preservation of community identification and character, preservation and enhancement of area aesthetics, preservation of quality of life, concerns over growth and the development it will bring, and the need to look at the project in more of a regional rather than local perspective.

- Participants felt the need for more information (impacts, costs, etc.) on which to make informed decisions. Several mentioned it would be helpful to have information more in advance of the meetings in order to study and come prepared.

- There was considerable discussion on the need for expanded and improved law enforcement on the highway, better public education on TDM, single vehicle impacts, etc., and the desire to get more people involved in the planning process.

- Strong support was given toward public transit (bus and rail options) and transportation demand management techniques (i.e. park and rides, etc.). Concern was expressed that these alternatives should be given full and adequate consideration during the study process.
- Discussion of possible construction alternatives for the highway included the following:

  - improve the existing 2-lane facility by adding additional turning lanes and occasional passing lanes where possible. This should also be coupled with an effort for better law enforcement and greater public education in terms of driving habits, etc.

  - There was widespread opposition to a 3-lane facility, noting the safety concerns and lack of passing opportunities.

  - A 4-lane facility with turning bays should be considered.

  - A 5-lane facility should be considered, particularly in areas where existing development demands a higher degree of access.

  - If any highway improvements are constructed, they should definitely include wide shoulders for use by pedestrians, bicycles, and farm vehicles.

- The concept of a freeway (controlled access interstate type) along the base of the Sapphire Mountains on the east side of the valley was developed. Some thought it should be included in future master plans, while others felt its cost and impacts would be excessive compared to other alternatives.

- The Silver Bridge and Bass Creek Hill realignments were generally supported.

- There was severe opposition to the concept of bypassing any urban areas, especially the Town of Hamilton. A show of hands vote was nearly unanimous against it.

Information received from the second series of public scoping meetings helped build public consensus, allowed some alternatives to be eliminated and placed greater emphasis on others (i.e. TDM alternatives), and brought up additional issues related to community identification, cohesion, and character. Also, at these meetings the issue of growth in the corridor and the impacts potentially associated with it began to emerge as a dominant, central issue with polarized views; those wishing to implement transportation improvements

to accommodate projected growth and those opposed to improvements on the grounds they would aggravate the growth issue ("if you build it, they will come!").

The trend at receiving considerable public input on issues and alternatives continued at the third series of public scoping meetings. In addition to significant attendance and comments received during the meeting, an appreciable degree of written input was submitted in response to the meetings. All verbal input received was noted, but the difficulty in tracking individual comments of nearly 200 participants with a project staff of only 10-12 persons precluded quantifying the frequency of individual comments. However, a summary of written comments and the number of times mentioned follows:

- Support for additional lanes (19)
- Do something now, don't wait until the year 2000 (10)
- Concern for safety of existing facility (6)
- TDM measures won't work (4)
- Presentation at meeting informative and appreciated (4)
- Slow drivers a problem / enforcement needed (4)
- Safety is important for new facility (3)
- Growth is considerable and will continue (2)
- Existing conditions bad and worsening (2)
- Support for TDM (park-and-ride, carpools, etc.) (2)
- Various miscellaneous (1 each)

The results of a survey taken by the Bitterroot Chamber of Commerce was also submitted as part of the written comments. It reiterated the major items mentioned above including demonstrating overwhelming support for the concept of additional lanes (89%).

Based on the confirmation of project issues and apparent degree of consensus being developed, the Advisory Committee and Interdisciplinary Team subsequently turned their attention toward development of a preferred alternative. After considering and refining the recommendations in review meetings after the third set of scoping meetings, final recommendations for a preferred alternative were made. These recommendations are included and discussed in this document.

7.26 PUBLIC HEARING

Once this draft EIS has been released to the public for consideration, a series of public hearings on the document, its conclusions and proposals will be announced. The meetings will be held at three separate times in three different locations similar to the public scoping meetings. This will be in an effort to provide greater access to those wishing to discuss the project with planning officials and provide further public input.

The format of the meeting will likely be similar to the third series of public scoping meetings. The meeting will take an "open house" type format where attenders will have the opportunity to be greeted by project personnel and either briefed on an overview of the study and its conclusions, or perhaps view a short video presentation covering similar material. Various information stations will be established around the meeting hall where people can go to find specific information on topics of interest, talk to the experts who prepared the studies, and have questions answered. A separate semi-private area will be provided where those wishing to make oral comment or give testimony may do so, having it recorded into the record for consideration. Written input forms will be available and a period of time will be allowed for submission of written comments after conclusion of the hearings.

Comments received will be considered and a responsiveness summary will be developed addressing unanswered questions and responding to new or significant issues raised. The summary will be distributed

to the information depositories and announcement of its availability will be made through local media. News releases may also be made if conditions warrant.

The final EIS will provide a summary of the public hearing in this section together with a summary of the issues raised and responses made to those issues and questions.

7.27 RECORD OF DECISION

The draft EIS will be revised according to input received at the public hearings. The final EIS thus developed will be submitted to regulatory agencies for concurrence. When concurrence is received, the final EIS and concurrence responses will be forwarded to the FHwA for review and approval of the proposed action. FHwA will issue a Record of Decision summarizing their review of the final EIS and their concurrence or recommendations.

Notification of the Record of Decision will be publicly advertized and the public will be given opportunity to provide additional input that may have a bearing on the decision, including the opportunity to have new significant issues considered that have not been previously addressed.

Once the Record of Decision is approved and finalized, MDT will seek to implement the proposed action(s), if approved. Final design would commence and construction/implementation of the proposed action(s) would follow shortly thereafter, pending funding availability.

7.28 REFERENCES

1. *US 93 Hamilton to Lolo Public Participation Plan* - Forsgren Associates, Inc.; West Yellowstone, MT - September 1992

2. Letter from Dale Paulson (FHwA) to Federal Register; September 17, 1992

3. Letter from Winston Dyer (Forsgren Associates, Inc.) to Interested Agencies and Property Owners; November 27, 1992

4. *"US 93 Hamilton to Lolo Transportation Improvements Study, Newsletter #1"* - Forsgren Associates, Inc.; West Yellowstone, MT - February 1994

5. *"US Highway 93 Verbal and Written Surveys Final Report"* - Dr. Joe W. Floyd, PhD; Billings, MT - October 1992

6. *"US Highway 93 Summary Report of Telephone Survey"* - Dr. Joe W. Floyd, PhD; Billings, MT - Janauary 29 to February 1, 1993

7. *"Hamilton-Lolo Transportation Corridor Analysis"* - Peter Schauer Associates; Boonville, MO - January 7, 1994

APPENDIX A

PRELIMINARY DESIGN

HAMILTON - VICTOR

APPENDIX A
PRELIMINARY DESIGN

The following pages present the preliminary design of the preferred alternative in the form of an overlay of engineering information on an aerial photographic background. The purpose of presenting this information is two-fold:

- To show the characteristics of the project corridor and items and areas that may potentially be impacted (as shown by the aerial photograph background).

- To demonstrate the degree of impact that "build" alternatives might have on the facility and adjacent properties (as shown by the blue colored overlay lines).

Preferably it would be best to show the impacts of all alternatives considered in this study on the aerial photograph background. Unfortunately, the need to show 55.1 km (34.2 mi) of information in a manner conducive to presentation in this EIS necessitates using the smallest practical scale that will still allow recognition of areas and their expected impacts. Trying to show overlays of all alternatives on this scale made it very difficult to differentiate between alternatives and greatly diminished the effectiveness of the presentation due to the confusion created by so much information in a small space.

Accordingly, the preliminary design shown herein is for the preferred alternative set forth in this EIS. This was done in order to portray information that would best represent what would likely occur in the corridor if the recommended improvements are implemented.

The information portrayed is also representative of the expected impacts that would occur for the other "build" alternatives. Extent of impacts in areas where the additional lane of the 2-land modified alternative would be located are nearly identical to the information shown. Areas where the additional lane is not present would have slightly less width and area of impact compared to what is shown.

The preferred alternative is comprised of a mix of the use of 4-lane undivided and 5-lane sections. Therefore, the information portrayed in this appendix is very representative of the impacts of those alternatives if they were used exclusively throughout the corridor. The area of impacts for the 4-lane divided alternative are approximately 33% greater than the 4-lane undivided or 5-lane segments. Adding approximately one-third of the distance between centerline and the proposed construction limit will give a good indication of the limits of construction associated with the 4-lane divided alternative.

Information portrayed on the pages herein includes the following. Important features and information are clearly labeled to help determine the location in the project corridor and to help identify features potentially impacted:

- Existing roads and adjacent properties on an aerial photo background (photo taken 1992). Aerial photographs show buildings, drainages, intersecting roads, and other physical features on the ground (main features labeled).

- Milepost locations.

- Sections lines and breakdowns of sections (e.g., SE¼ Sec 1).

- Property lines of record.

- Proposed centerline of new road.

- Stationing along the proposed centerline. Stationing given is distance in meters and hundreds of meters. For example, 9+00 = 900 meters. Each tick mark along the centerline represents an interval of 20 meters (65.6 ft). One meter equals 3.28 feet.

- Proposed edge of pavement.

- Proposed construction limits, which are the limits of ground disturbance.

- Proposed right-of-way.

- Information in the middle of the page between the two strips of aerial photograph calls out the name of the segment in which the area lies (see below), the scale (metric scale of 1 to 300, that is, everything shown on the maps will be 300 times larger in real life), and an indication of the lane configuration of the preferred alternative to be used at the location shown (4-lane, 5-lane, and 5-lane urban which includes curb and gutter).

It is likely the project corridor will be broken up into segments for the purpose of developing projects to implement any proposed improvement alternatives. The following identifies those segments:

Segment	Milepost Limits	Length	Metric Stationing *
Hamilton to Victor	49.0 - 59.0	16.1 km (10.0 mi)	9+00 to 169+07
Victor to Florence	59.0 - 74.1	24.3 km (15.1 mi)	10+00 to 251+88
Florence to Lolo	74.1 - 83.2	14.7 km (9.1 mi)	10+00 to 159+56
		55.1 km (34.2 mi)	

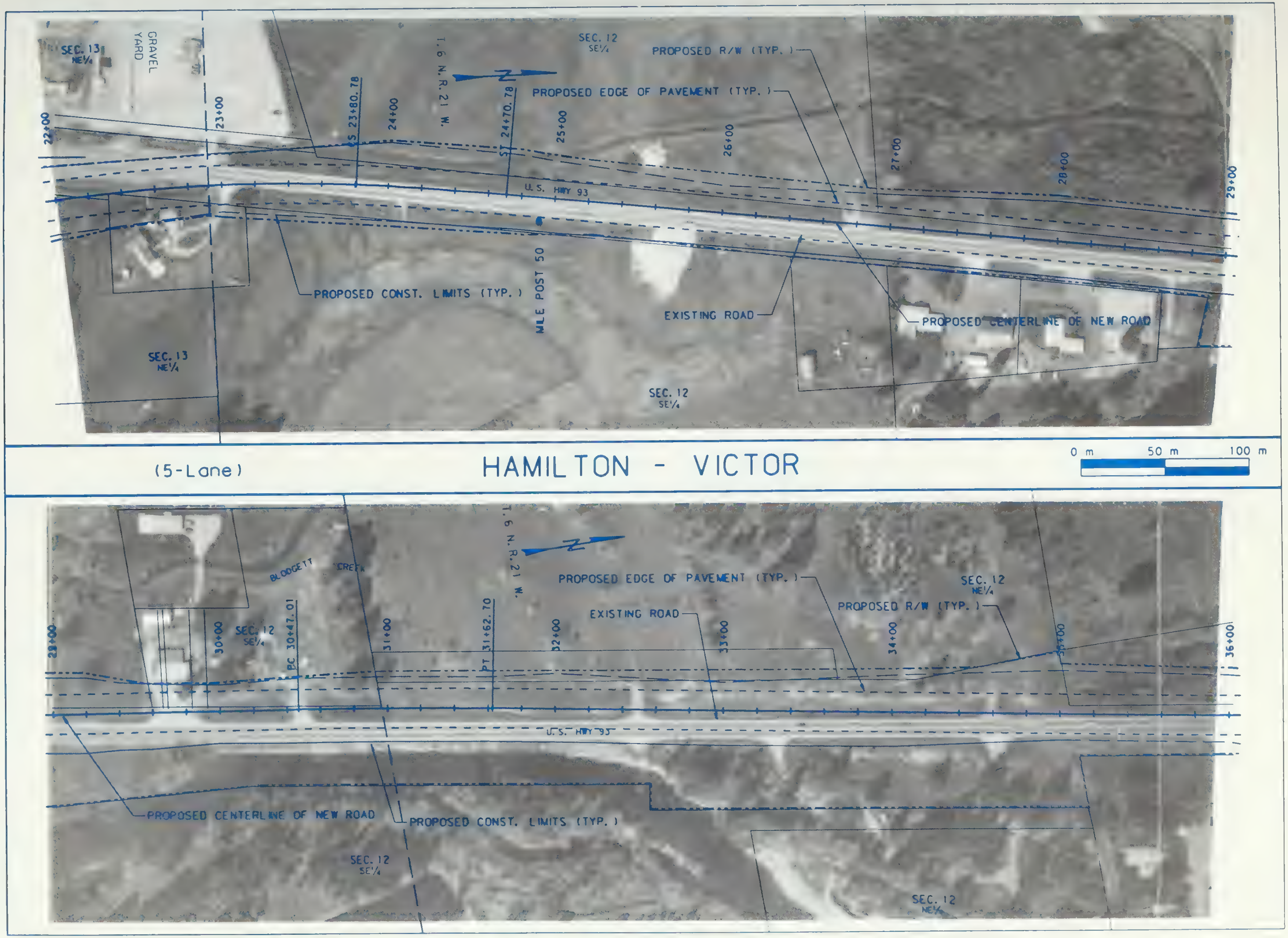
* Follows stationing given on aerial photographic mapping herein (distance in meters, 1+00 = 100 meters)

Although the information shown here represents the preferred alternative, a preliminary design overlay has been created for each of the "build" alternatives giving the same type of information shown here. Those needing further information for other alternatives or having questions about the information presented herein are invited to contact the Project Manager at 1-800-331-7548 for clarification.

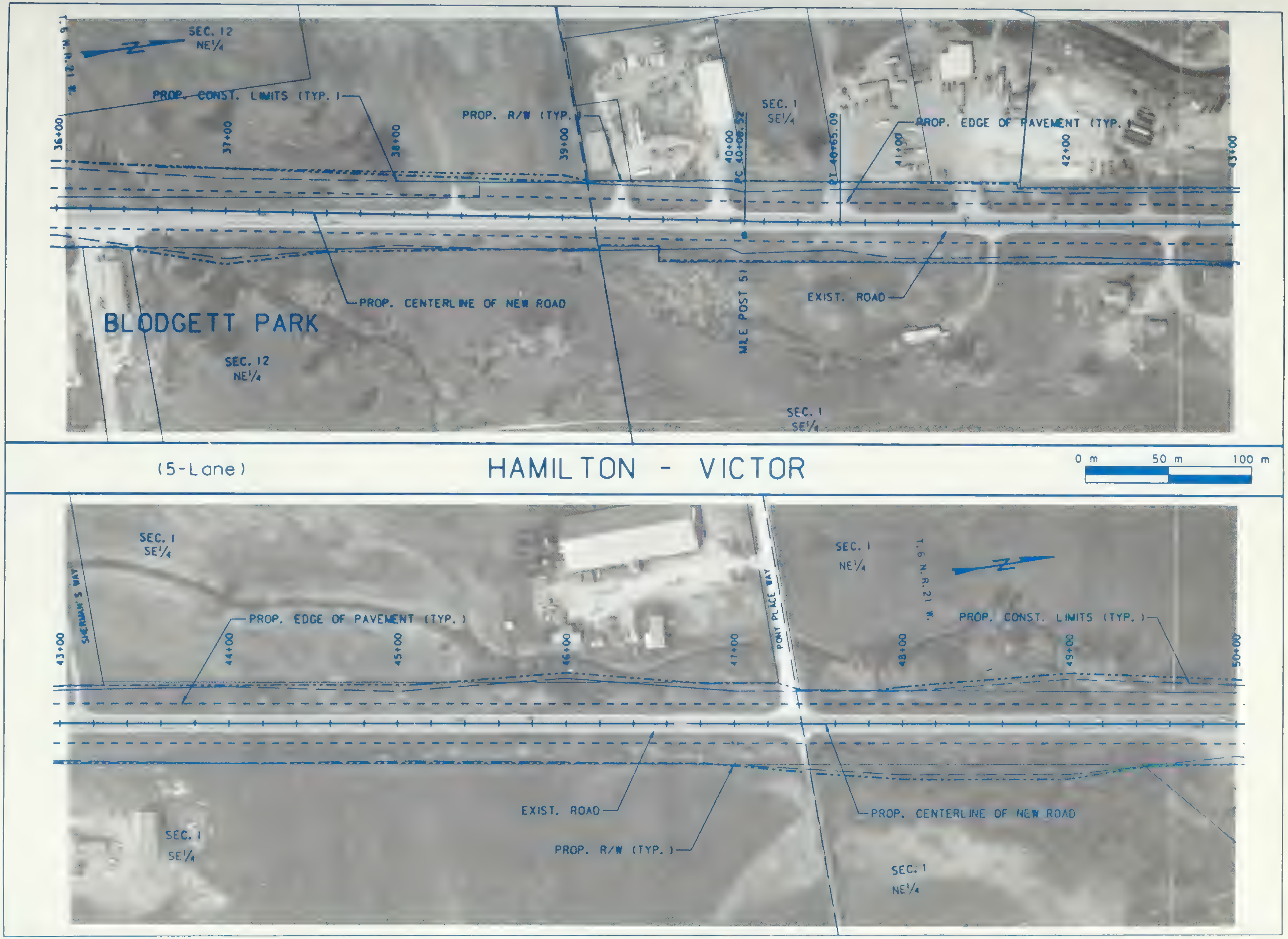
(5-Lane Urban To 5-Lane To 4-Lane)
(4-Lane To 5-Lane)

HAMILTON - VICTOR

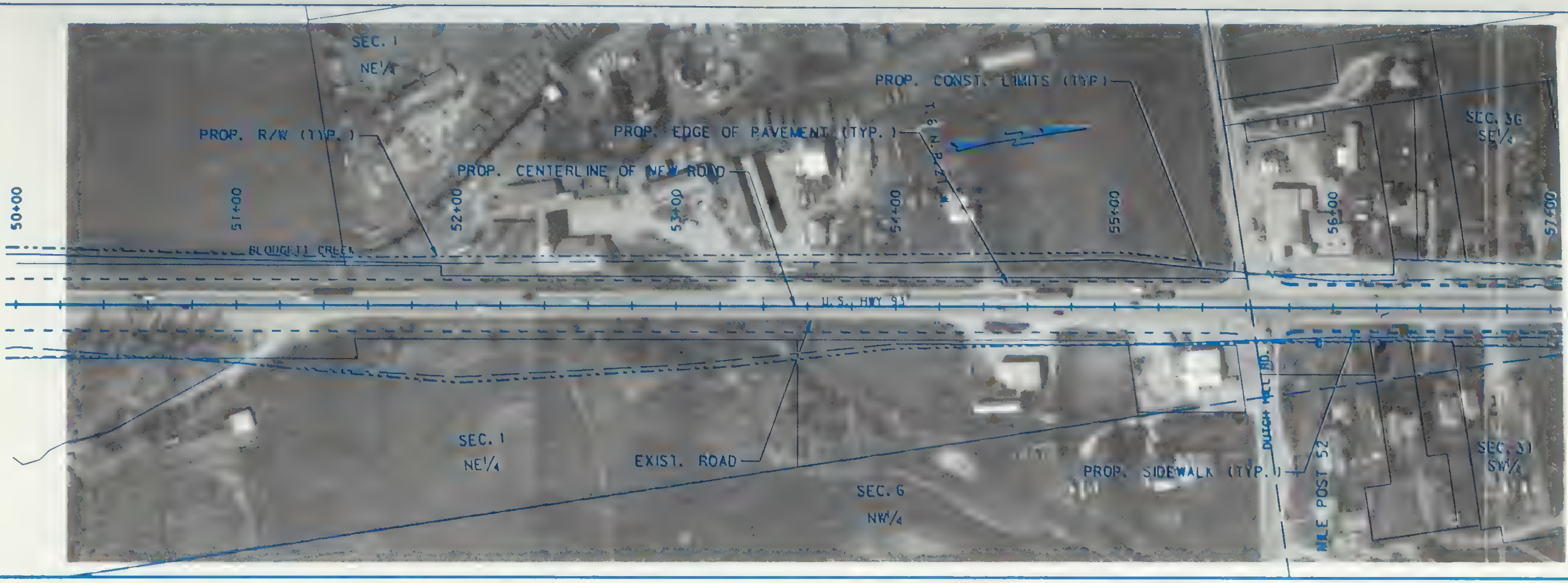
0 m 50 m 100 m



SEC. 13 NE¼
GRAVEL YARD
SEC. 12 SE¼
PROPOSED R/W (TYP.)
PROPOSED EDGE OF PAVEMENT (TYP.)
T. 6 N. R. 21 W.
22+00
23+00
CS 23+80.78
24+00
ST 24+70.78
25+00
26+00
27+00
28+00
29+00
U.S. HWY 93
MILE POST 50
PROPOSED CONST. LIMITS (TYP.)
EXISTING ROAD
PROPOSED CENTERLINE OF NEW ROAD
SEC. 13 NE¼
SEC. 12 SE¼
(5-Lane)
HAMILTON - VICTOR
0 m
50 m
100 m
BLODGETT CREEK
T. 6 N. R. 21 W.
PROPOSED EDGE OF PAVEMENT (TYP.)
SEC. 12 NE¼
EXISTING ROAD
PROPOSED R/W (TYP.)
29+00
30+00
SEC. 12 SE¼
PC 30+47.01
31+00
PT 31+62.70
32+00
33+00
34+00
35+00
36+00
U.S. HWY 93
PROPOSED CENTERLINE OF NEW ROAD
PROPOSED CONST. LIMITS (TYP.)
SEC. 12 SE¼
SEC. 12 NE¼



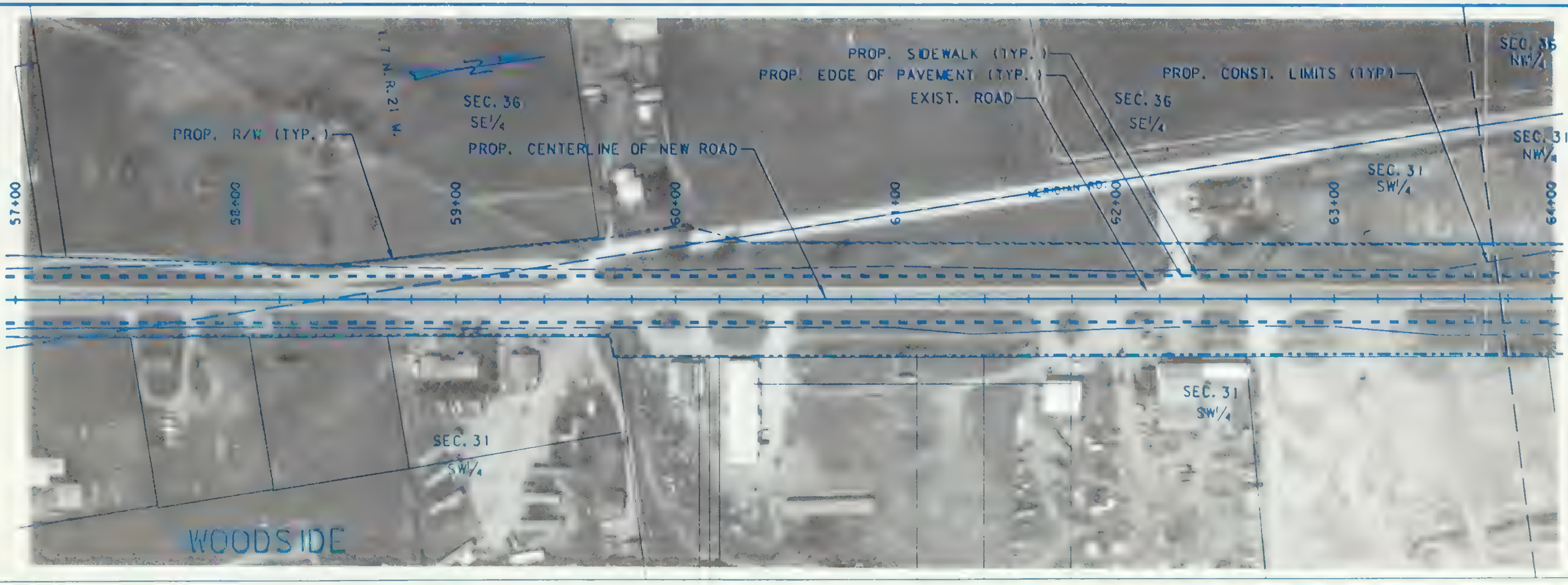
HAMILTON - VICTOR
(5-Lane)
0 m
50 m
100 m
T.6 N.R.21 W.
SEC. 12 NE1/4
PROP. CONST. LIMITS (TYP.)
PROP. R/W (TYP.)
SEC. 1 SE1/4
PROP. EDGE OF PAVEMENT (TYP.)
36+00
37+00
38+00
39+00
40+00
PC 40+08.52
PT 40+65.09
41+00
42+00
43+00
BLODGETT PARK
PROP. CENTERLINE OF NEW ROAD
MILE POST 51
EXIST. ROAD
SEC. 12 NE1/4
SEC. 1 SE1/4
SEC. 1 SE1/4
SHERMAN'S WAY
PROP. EDGE OF PAVEMENT (TYP.)
43+00
44+00
45+00
46+00
47+00
PONY PLACE WAY
SEC. 1 NE1/4
T.6 N.R.21 W.
PROP. CONST. LIMITS (TYP.)
48+00
49+00
50+00
EXIST. ROAD
PROP. R/W (TYP.)
PROP. CENTERLINE OF NEW ROAD
SEC. 1 SE1/4
SEC. 1 NE1/4

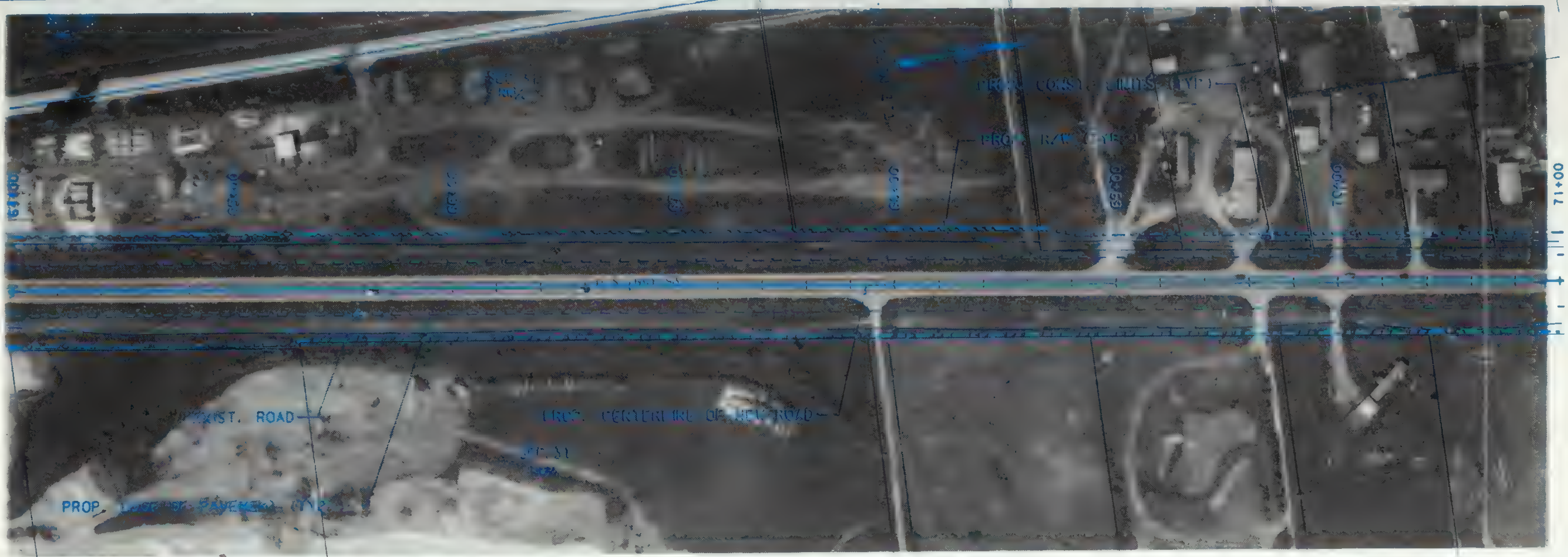


(5-Lane to 5-Lane Urban)
(5-Lane Urban)

HAMILTON - VICTOR

0 m 50 m 100 m



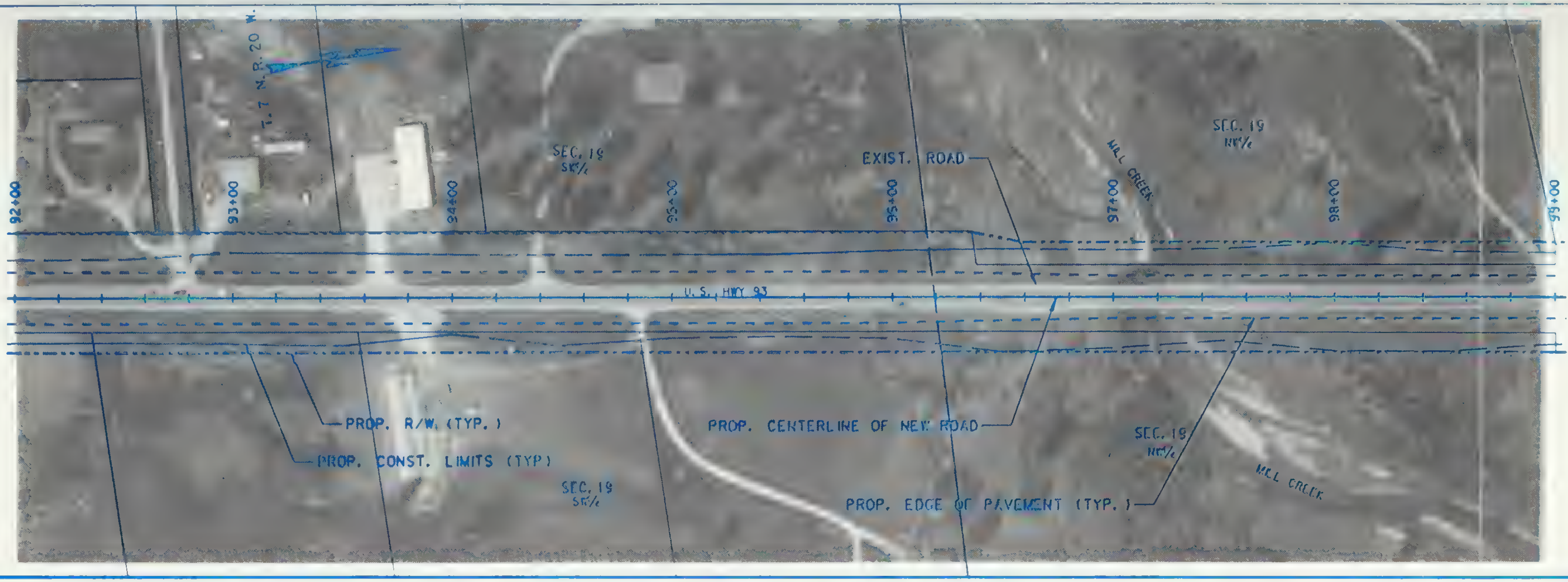


(5-Lane)

HAMILTON - VICTOR

0 m 50 m 100 m

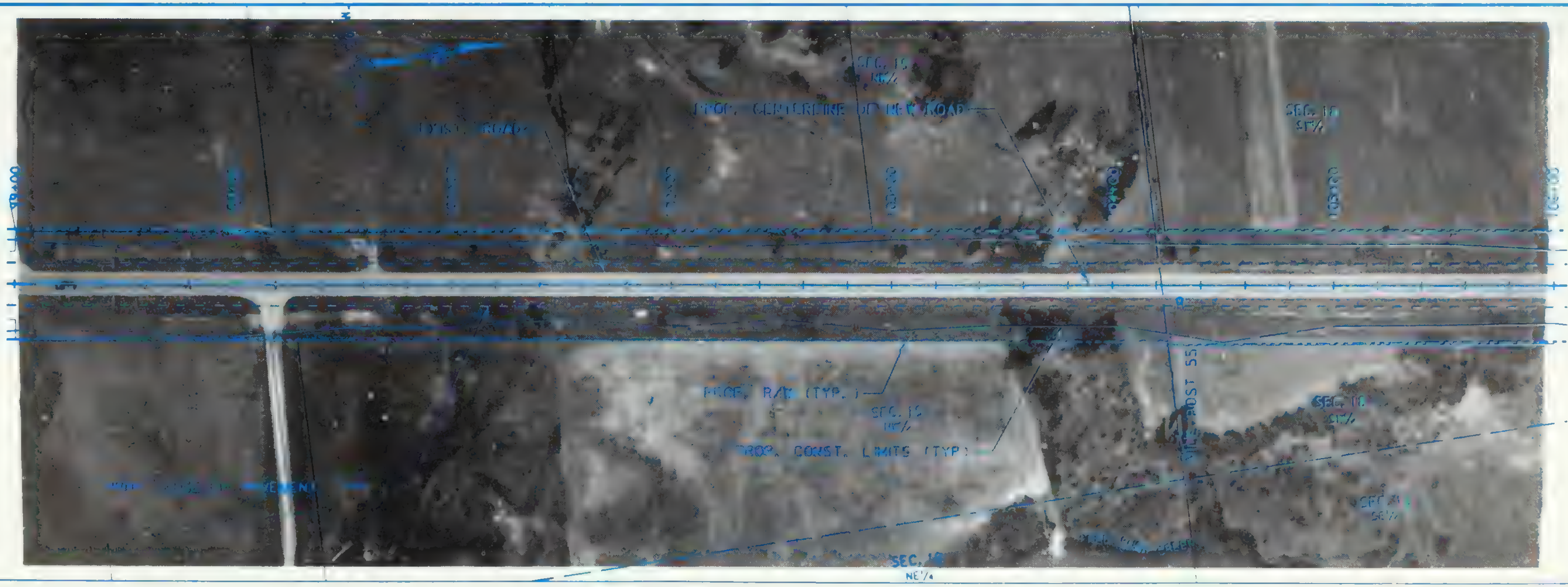

HAMILTON - VICTOR
(5-Lane)
0 m
50 m
100 m
78+00
79+00
80+00
81+00
82+00
83+00
84+00
85+00
SEC. 30 SW/4
PROP. CONST. LIMITS (TYP.)
SEC. 30 NW/4
T. 7 N. R. 20 W.
PROP. R/W (TYP.)
EXIST. ROAD
U.S. HWY 93
PROP. EDGE OF PAVEMENT (TYP.)
PROP. CENTERLINE OF NEW ROAD
SEC. 30 NW/4
SEC. 30 SW/4
86+00
87+00
88+00
89+00
90+00
91+00
92+00
SEC. 30 NW/4
T. 7 N. R. 20 W.
PROP. R/W (TYP.)
SHEAFMAN CREEK RD.
SEC. 19 SW/4
PROP. CONST. LIMITS (TYP.)
U.S. HWY 93
EXIST. ROAD
SEC. 30 NW/4
PROP. EDGE OF PAVEMENT (TYP.)
MILE POST 54
SEC. 19 SW/4
PROP. CENTERLINE OF NEW ROAD

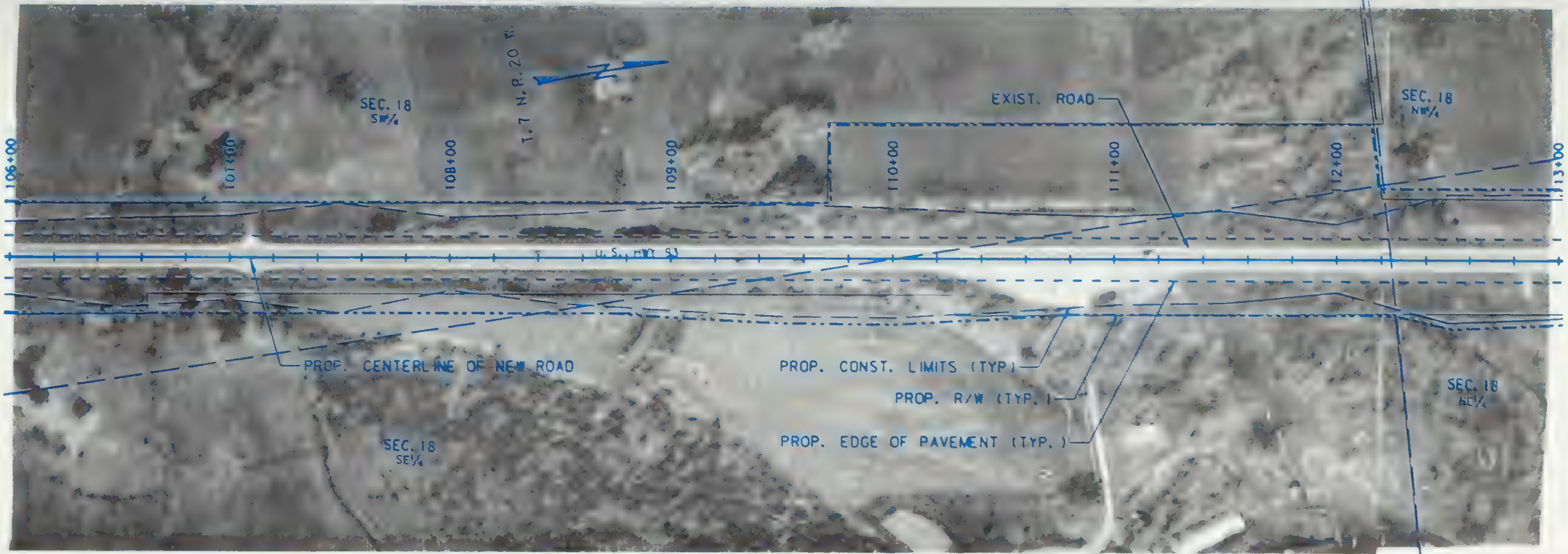


(5-Lane To 4-Lane)
(4-Lane)

HAMILTON - VICTOR

0 m 50 m 100 m

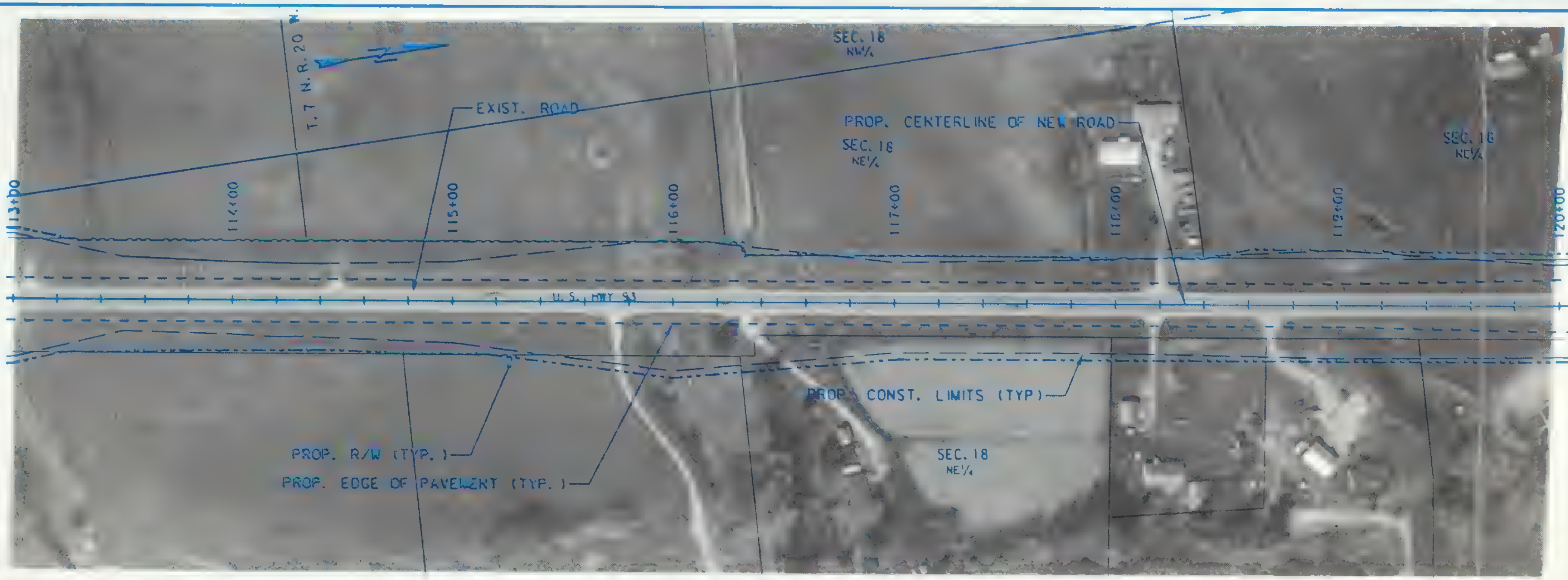


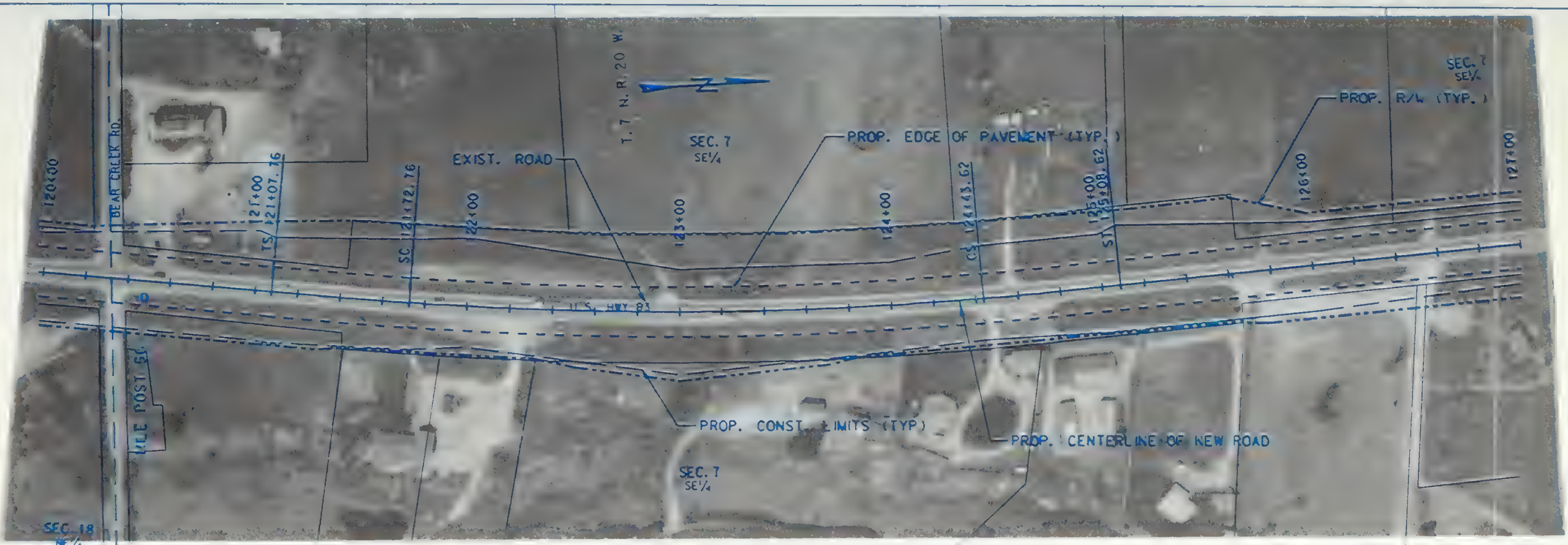


(4-Lane)
(4-Lane To 5-Lane)

HAMILTON - VICTOR

0 m 50 m 100 m

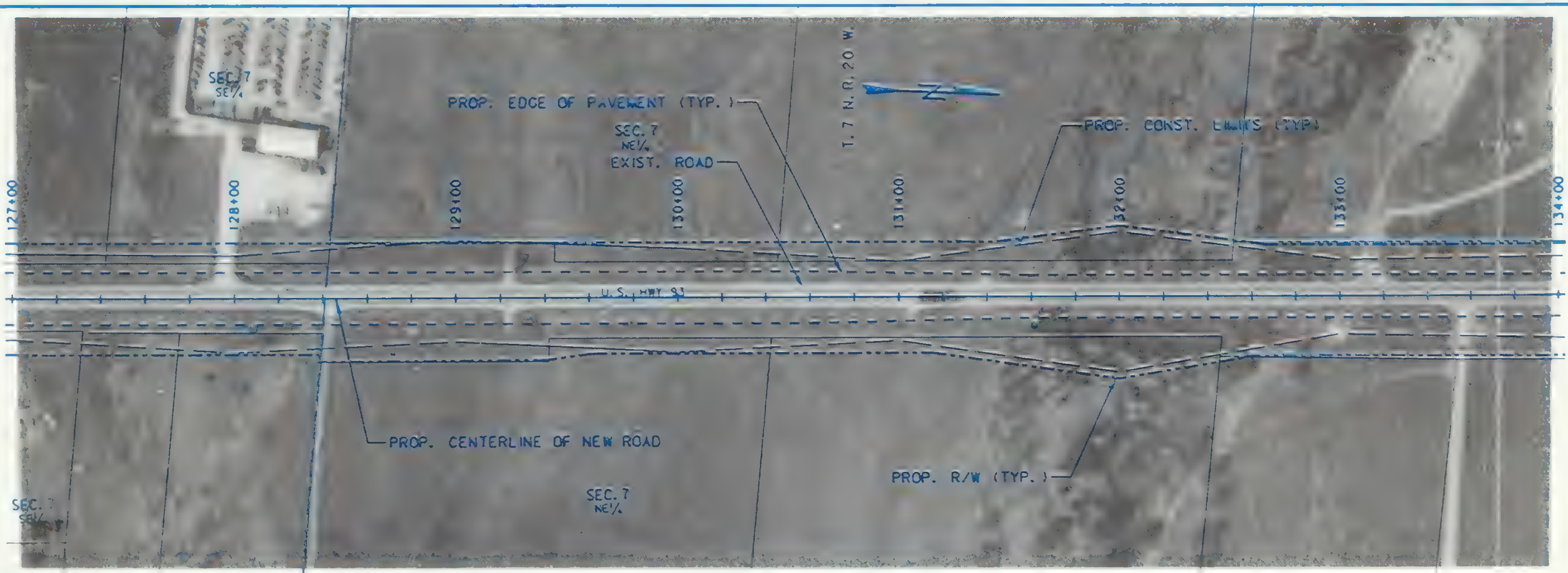


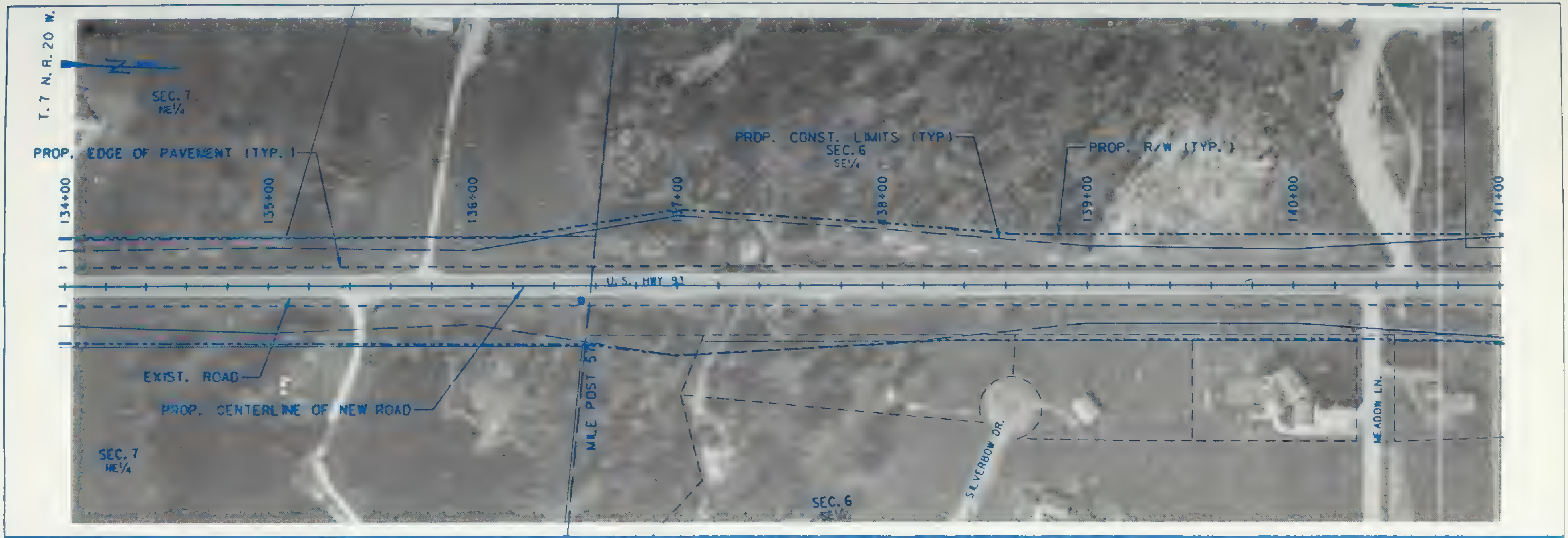


(5-Lane)
(5-Lane To 4-Lane)

HAMILTON - VICTOR

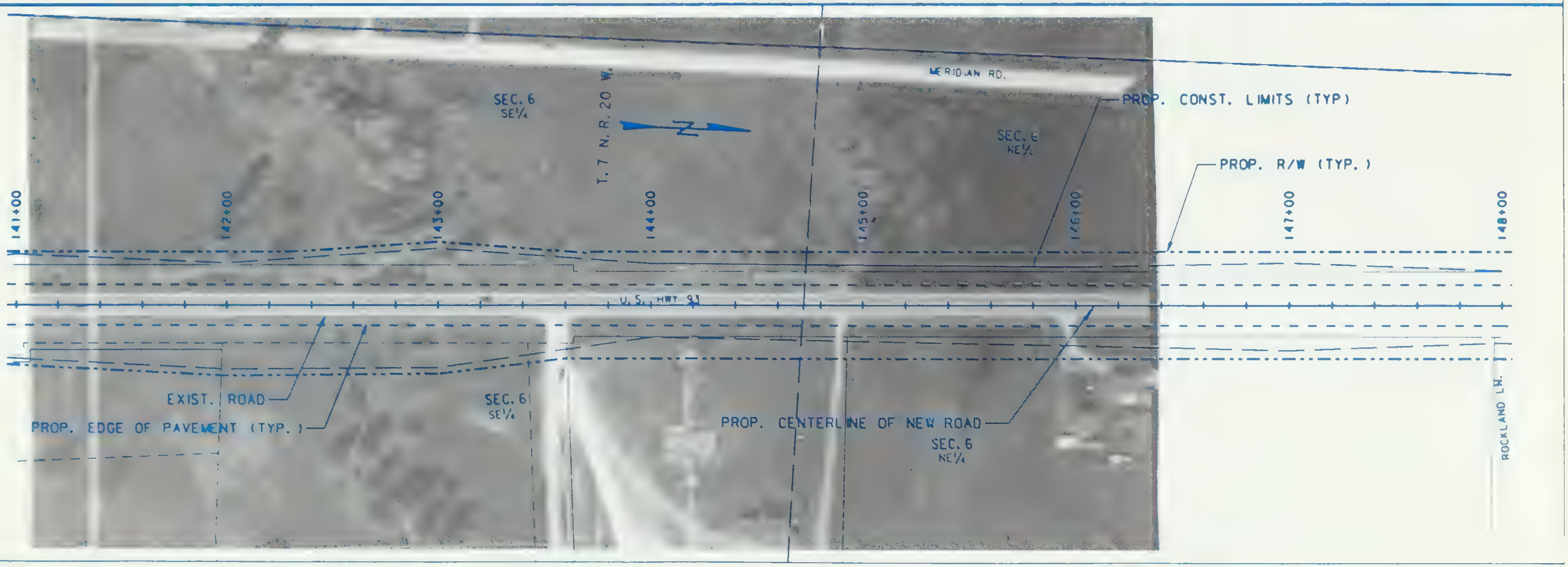
0 m 50 m 100 m

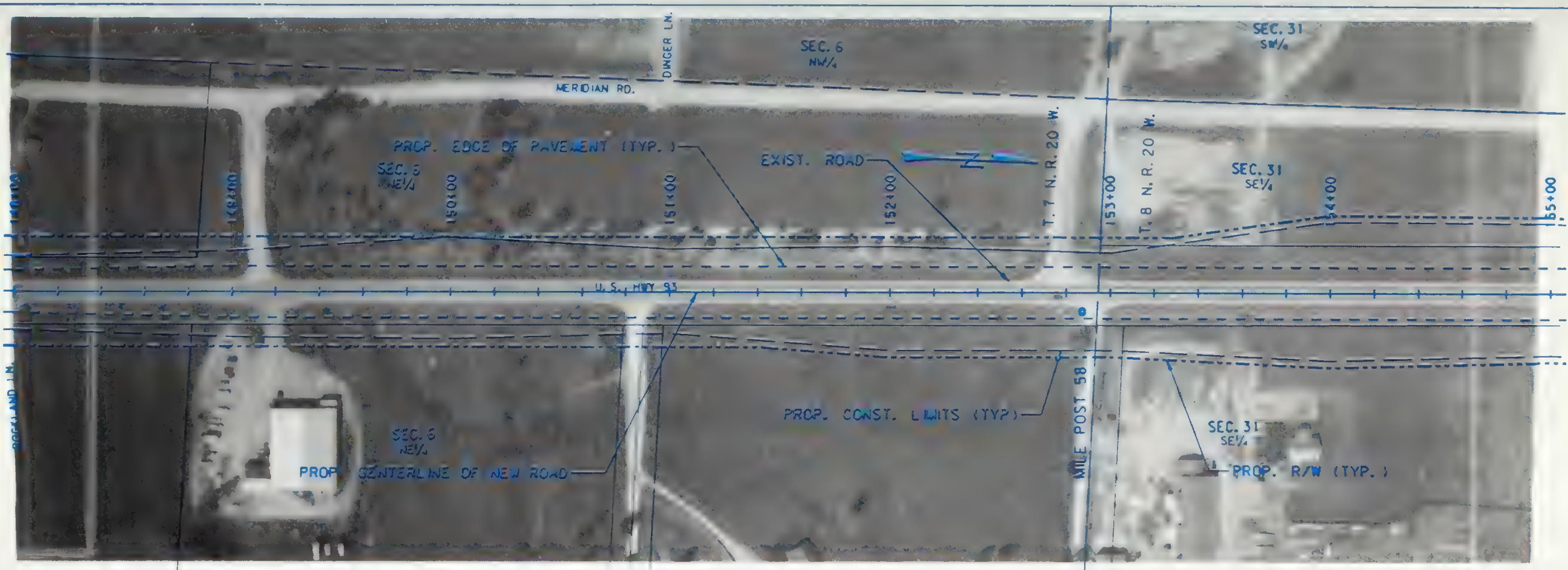




(4-Lane) HAMILTON - VICTOR

0 m 50 m 100 m

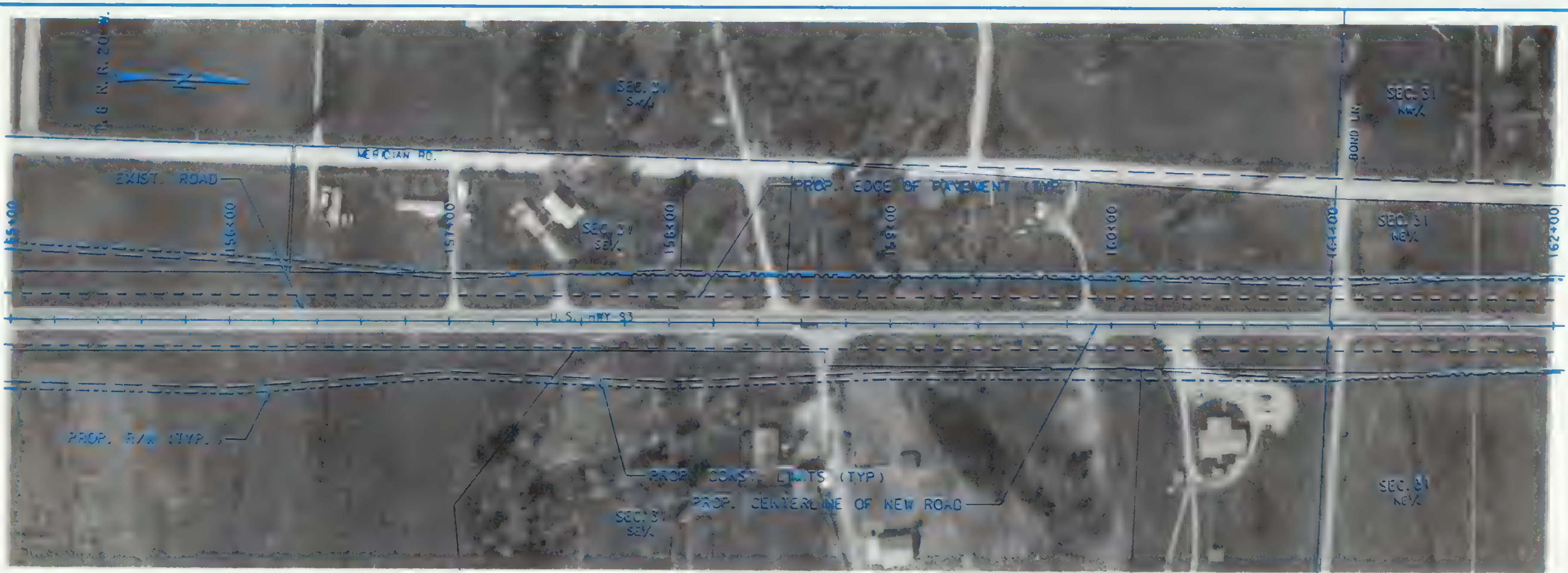


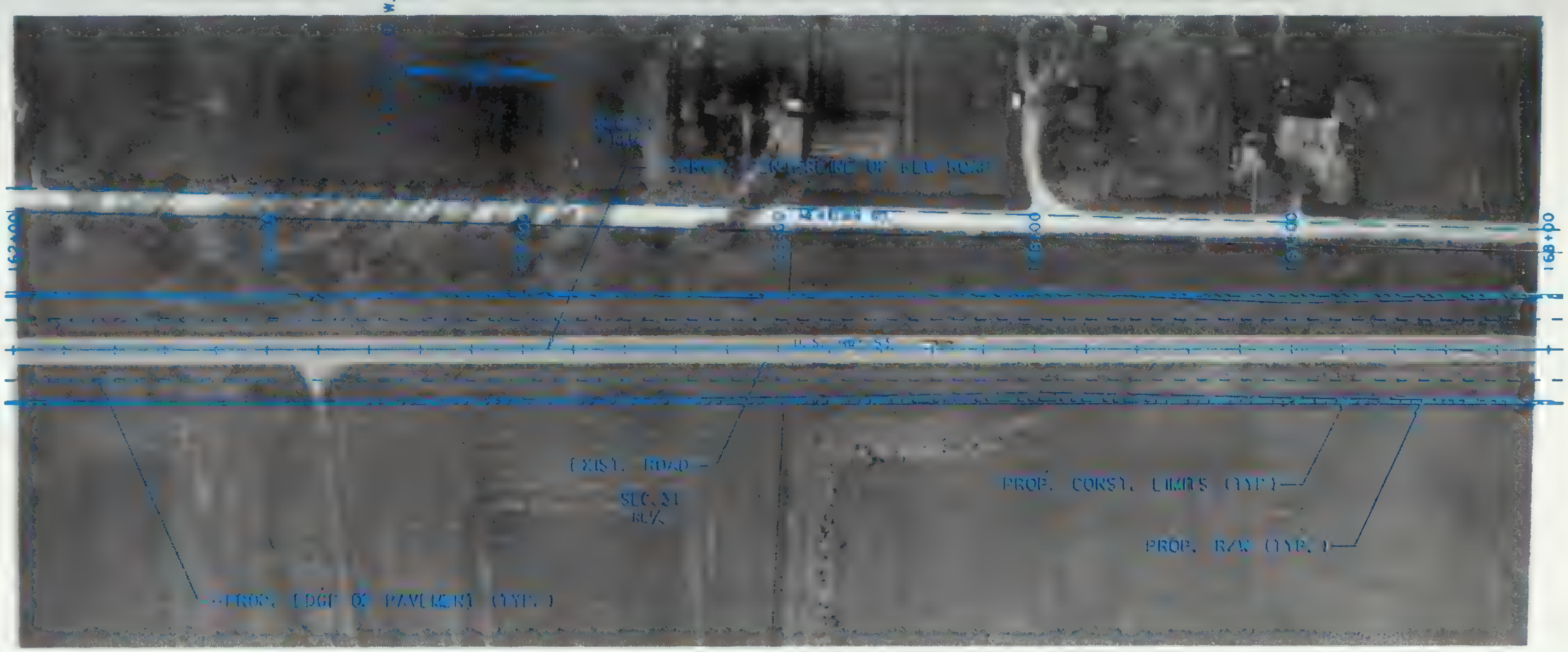


(4-Lane To 5-Lane)
(5-Lane)

HAMILTON - VICTOR

0 m 50 m 100 m





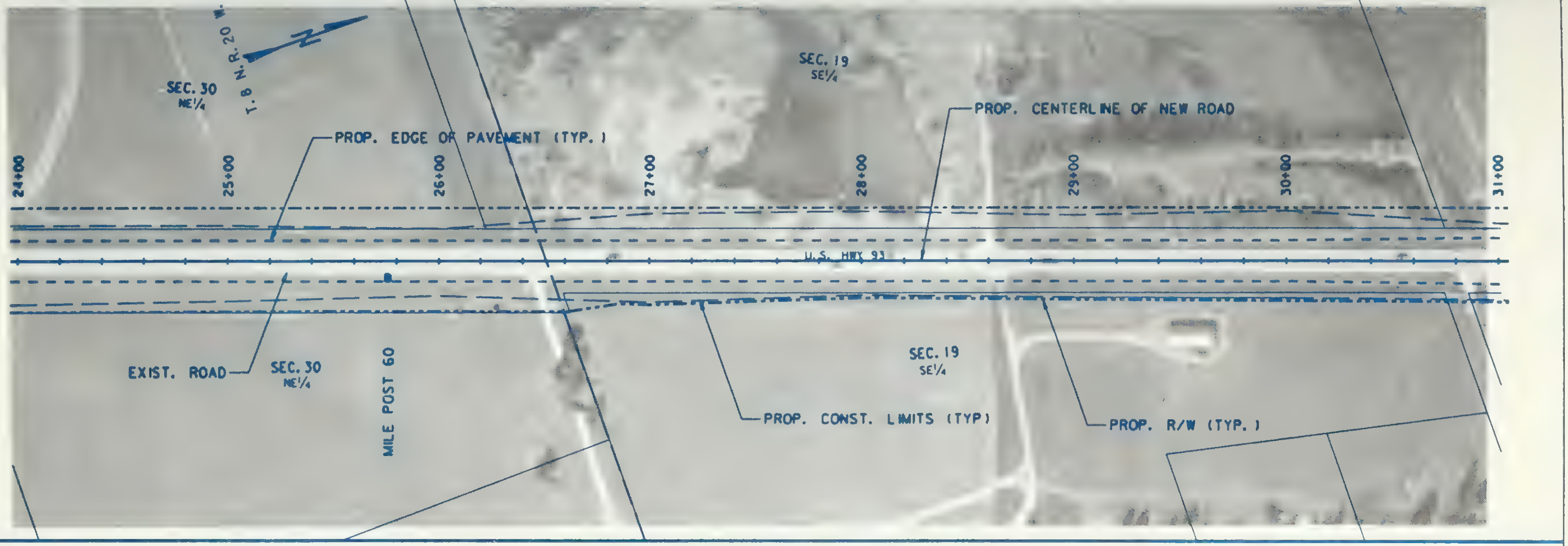
(5-Lane) HAMILTON - VICTOR

0 m 50 m 100 m

VICTOR - FLORENCE


T. 8 N. R. 20 W.
PROP. SIDEWALK (TYP.)
EXIST. ROAD
FOURTH AVE.
PROP. EDGE OF PAVEMENT (TYP.)
FIFTH AVE.
SEC. 30
SE¼
CITY OF VICTOR
MAIN STREET
PROP. CENTERLINE OF NEW ROAD
SIXTH AVE.
10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
U.S. HWY 93
STA. 10+00.00
BEGIN PROJECT
VICTOR TO FLORENCE
PROP. R/W (TYP.)
PROP. CONST. LIMITS (TYP.)
SEC. 30
SE¼
MAIN STREET
(5-Lane Urban To 5-Lane)
(5-Lane to 4-Lane)
VICTOR - FLORENCE
0 m
50 m
100 m
PROP. EDGE OF PAVEMENT (TYP.)
SEC. 30
NW¼
MERIDIAN RD.
CREEK
PROP. CENTERLINE OF NEW ROAD
SEC. 30
NE¼
T. 8 N. R. 20 W.
17+00
19+00
CS 19+50.70
20+00
20+35.70
21+00
22+00
23+00
24+00
U.S. HWY 93
SEC. 30
NE¼
PROP. R/W (TYP.)
EXIST. ROAD
SEC. 30
SE¼
PROP. CONST. LIMITS (TYP.)
CITY OF VICTOR

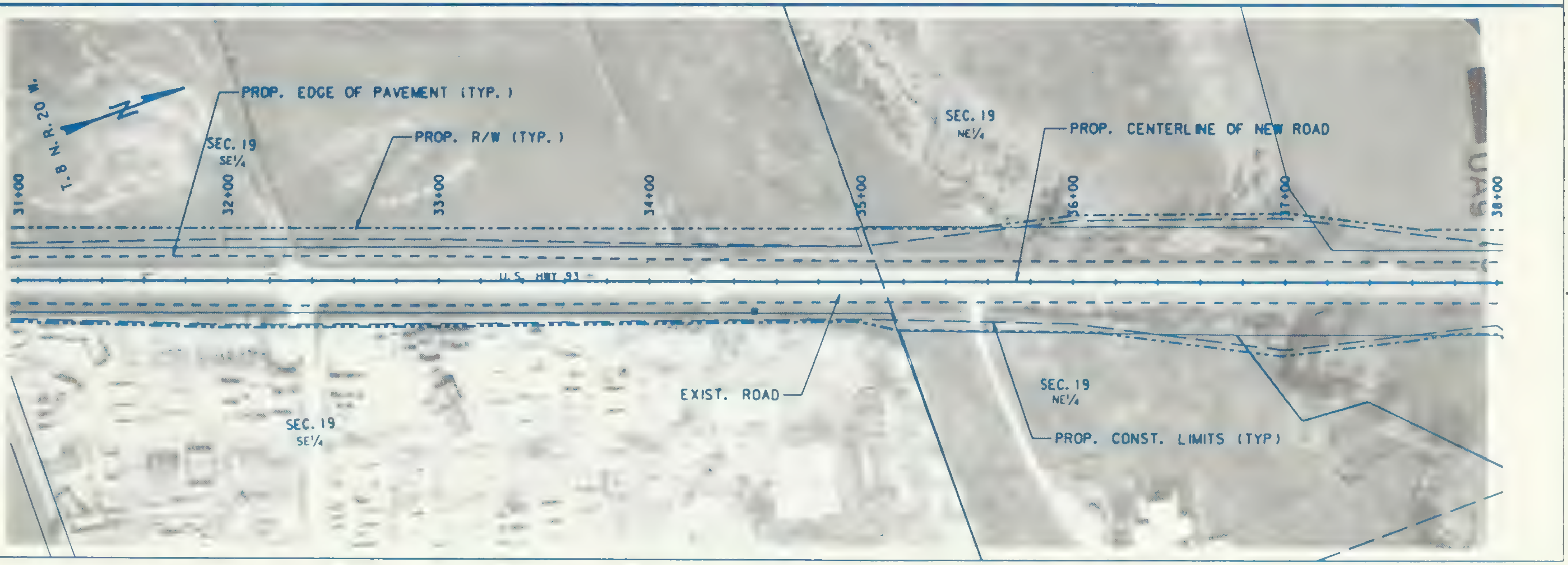
T. 8 N. R. 20 W.
FOURTH AVE.
FIFTH AVE.
MAIN STREET
SIXTH AVE.
PROP. SIDEWALK (TYP.)
EXIST. ROAD
PROP. EDGE OF PAVEMENT (TYP.)
SEC. 30 SW¼
CITY OF VICTOR
PROP. CENTERLINE OF NEW ROAD
10+00
11+00
12+00
13+00
14+00
15+00
16+00
TS 16+04.08
SC 16+89.08
17+00
U.S. HWY 93
STA. 10+00.00 BEGIN PROJECT VICTOR TO FLORENCE
SEC. 30 SE¼
PROP. R/W (TYP.)
PROP. CONST. LIMITS (TYP.)
MAIN STREET
(5-Lane Urban To 5-Lane)
(5-Lane to 4-Lane)
VICTOR - FLORENCE
0 m
50 m
100 m
PROP. EDGE OF PAVEMENT (TYP.)
SEC. 30 NW¼
MERIDIAN RD.
CREEK
SLAUGHTERHOUSE
PROP. CENTERLINE OF NEW ROAD
SEC. 30 NE¼
T. 8 N. R. 20 W.
17+00
19+00
CS 19+50.70
20+00
ST 20+35.70
21+00
22+00
23+00
24+00
U.S. HWY 93
SEC. 30 SE¼
SEC. 30 NE¼
PROP. R/W (TYP.)
PROP. CONST. LIMITS (TYP.)
EXIST. ROAD
CITY OF VICTOR

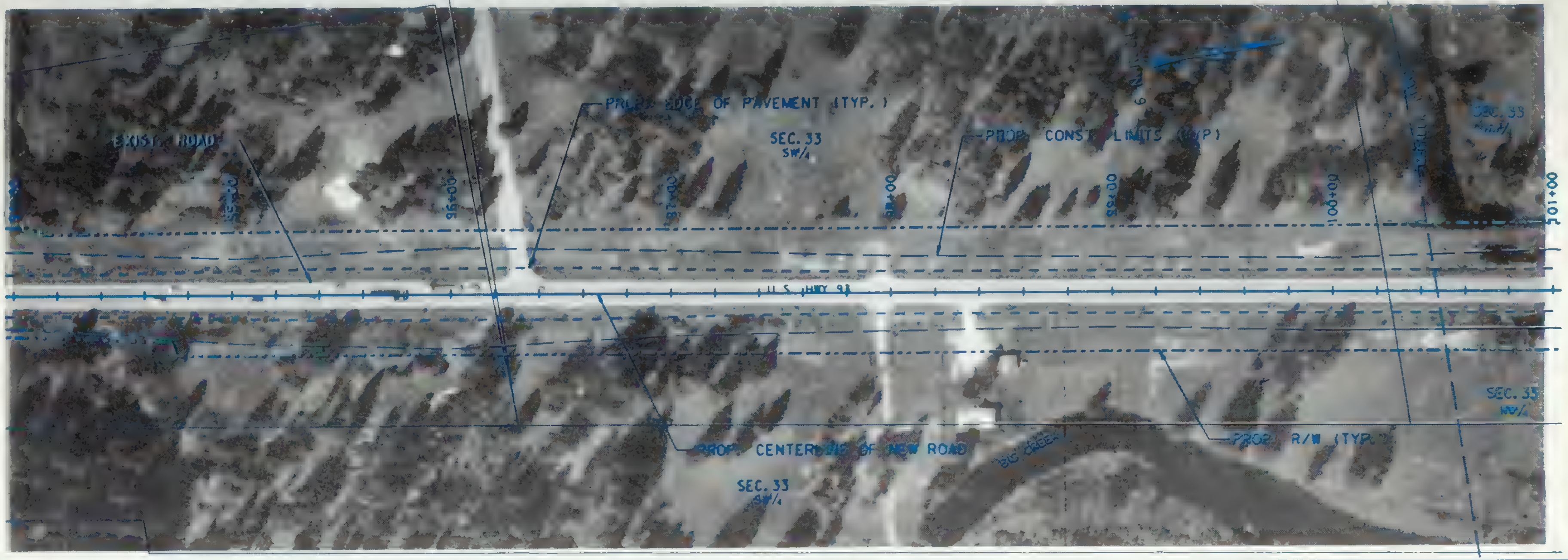


(4-Lane To 5-Lane)
(5-Lane To 4-Lane)

VICTOR - FLORENCE

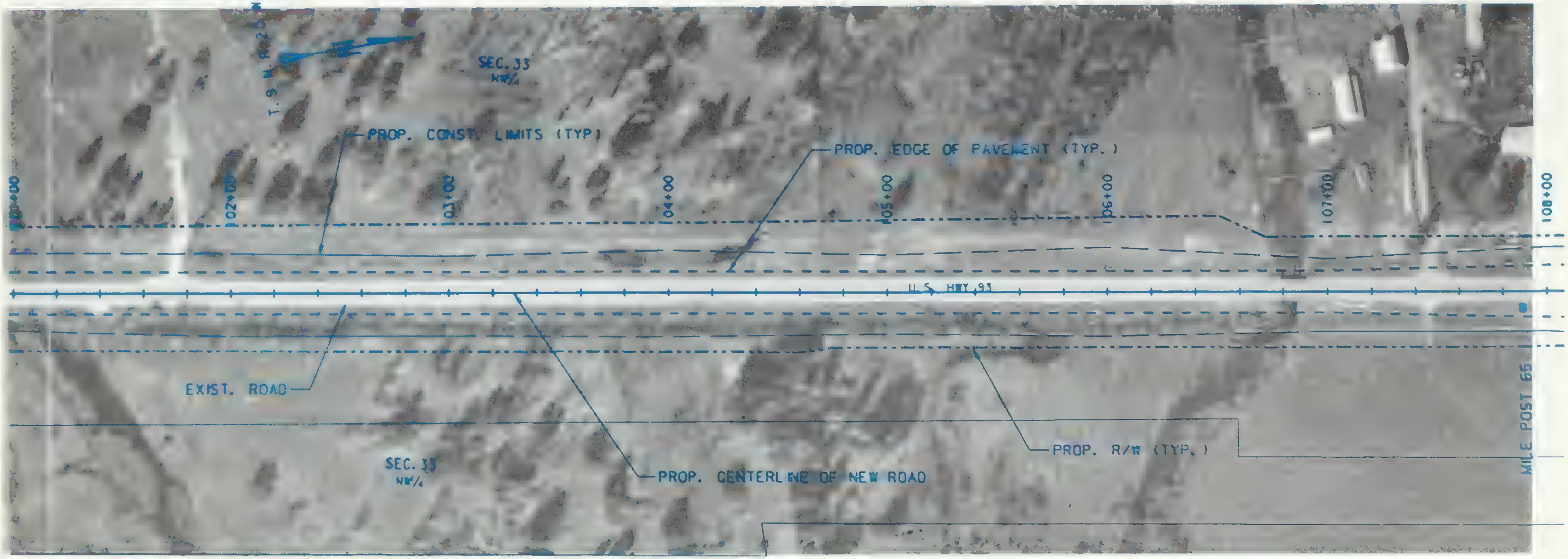
0 m 50 m 100 m

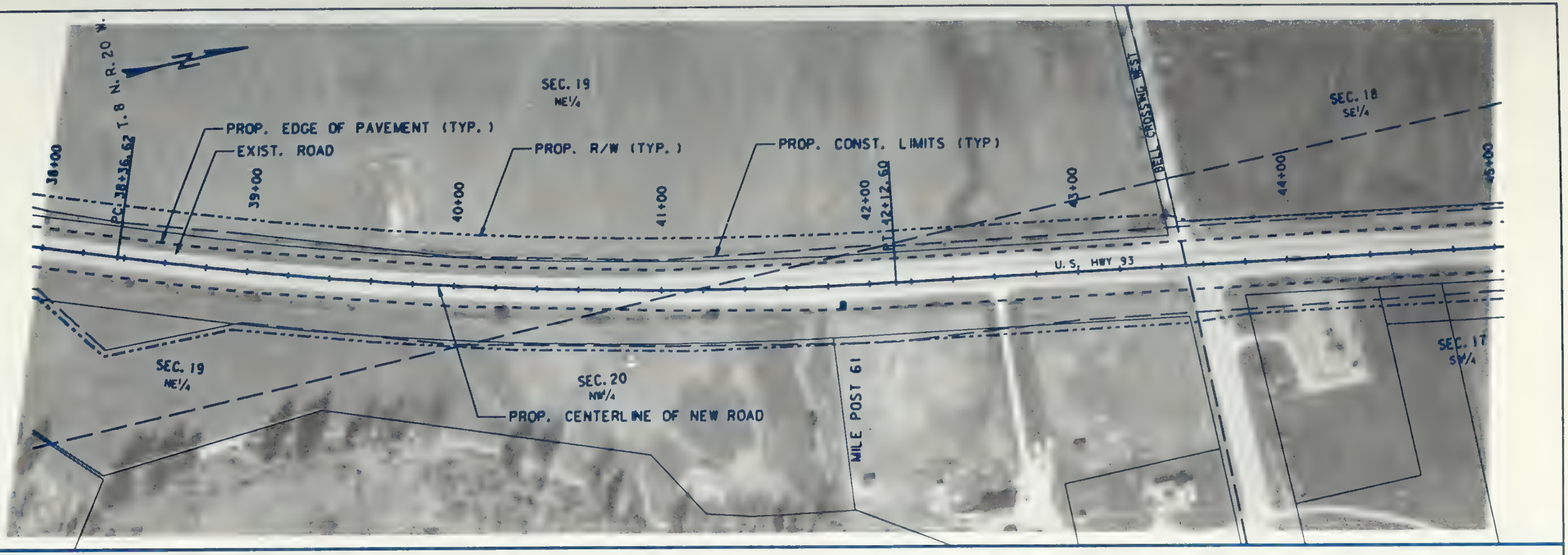




(4-Lane To 5-Lane To 4-Lane)
(4-Lane To 5-Lane)

VICTOR - FLORENCE

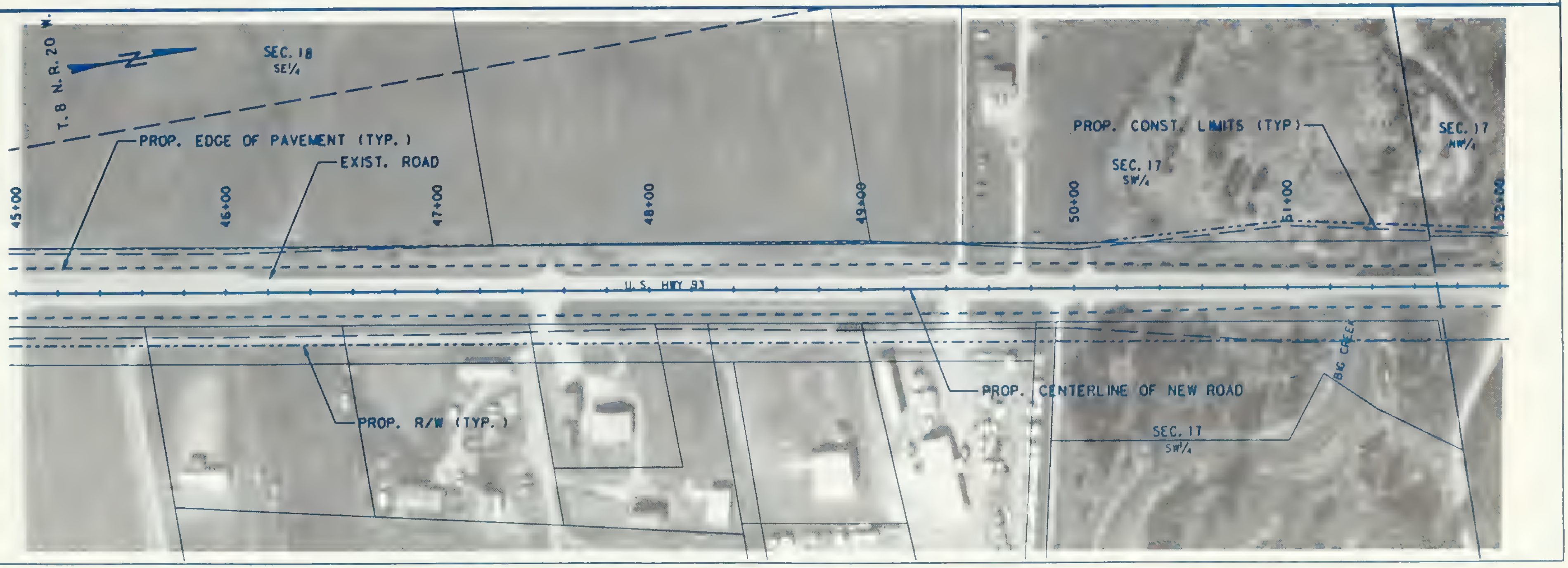




(4-Lane To 5-Lane)
(5-Lane To 4-Lane)

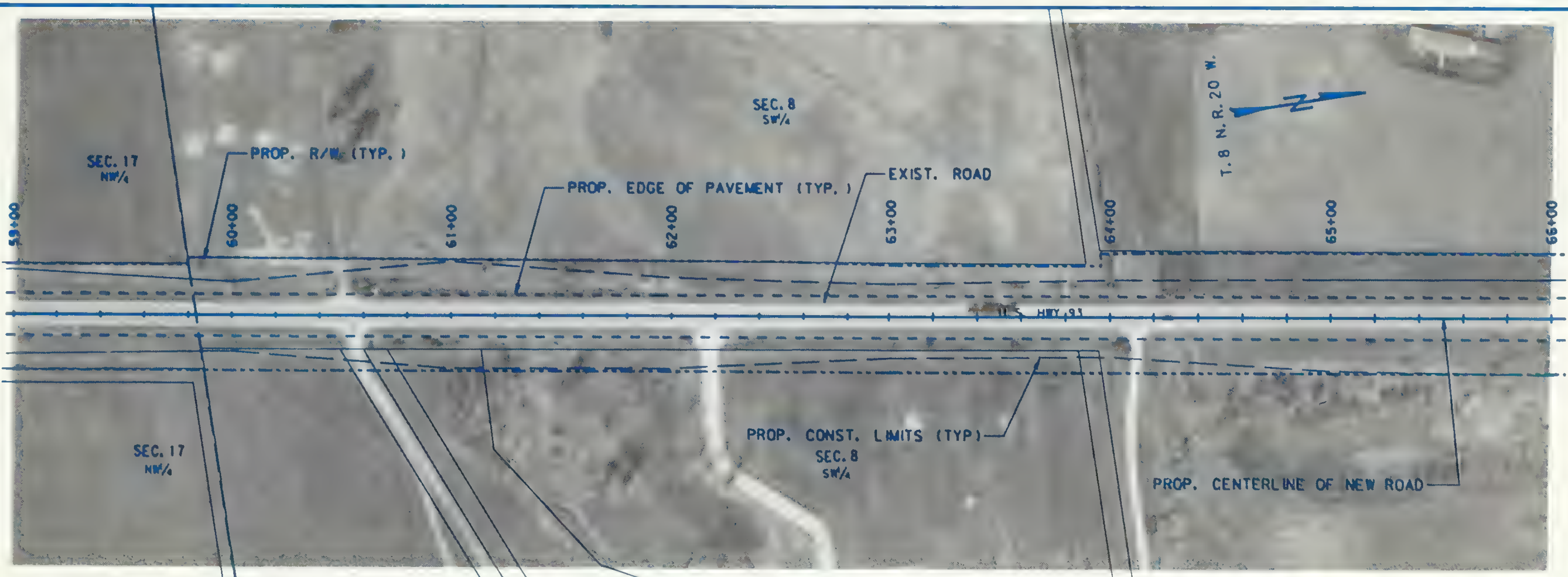
VICTOR - FLORENCE

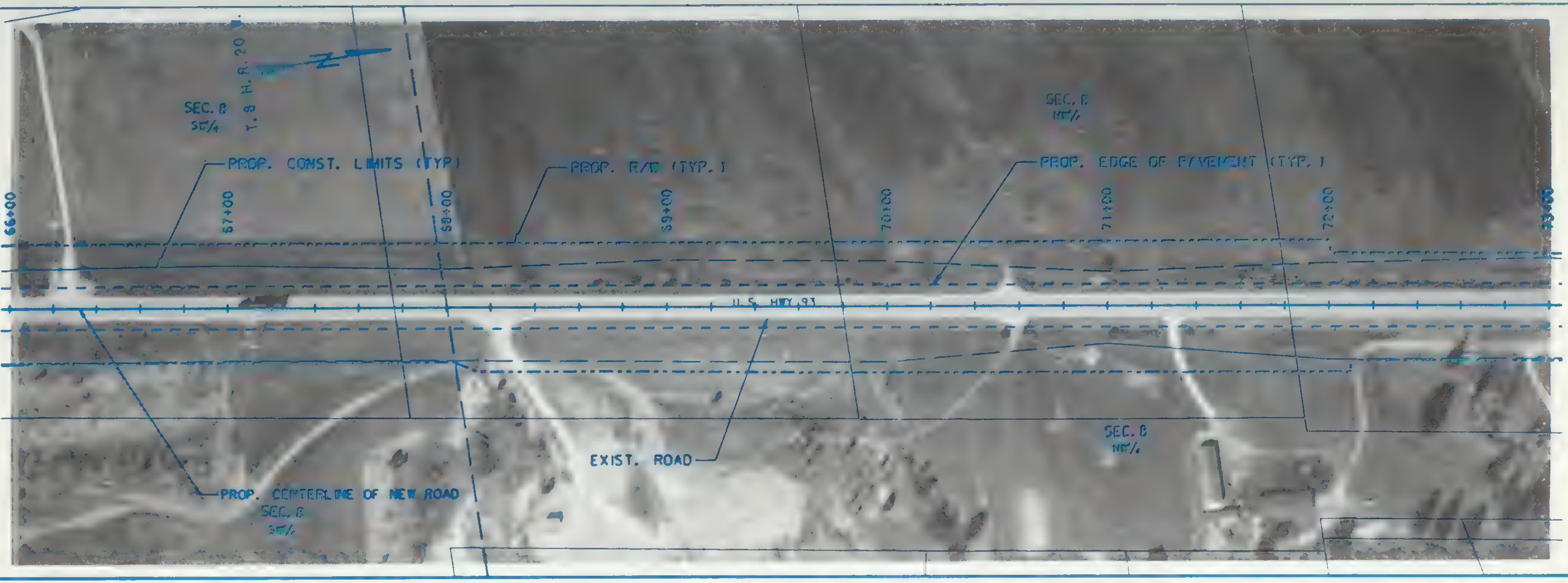
0 m 50 m 100 m



(4-Lane) VICTOR - FLORENCE

0 m 50 m 100 m

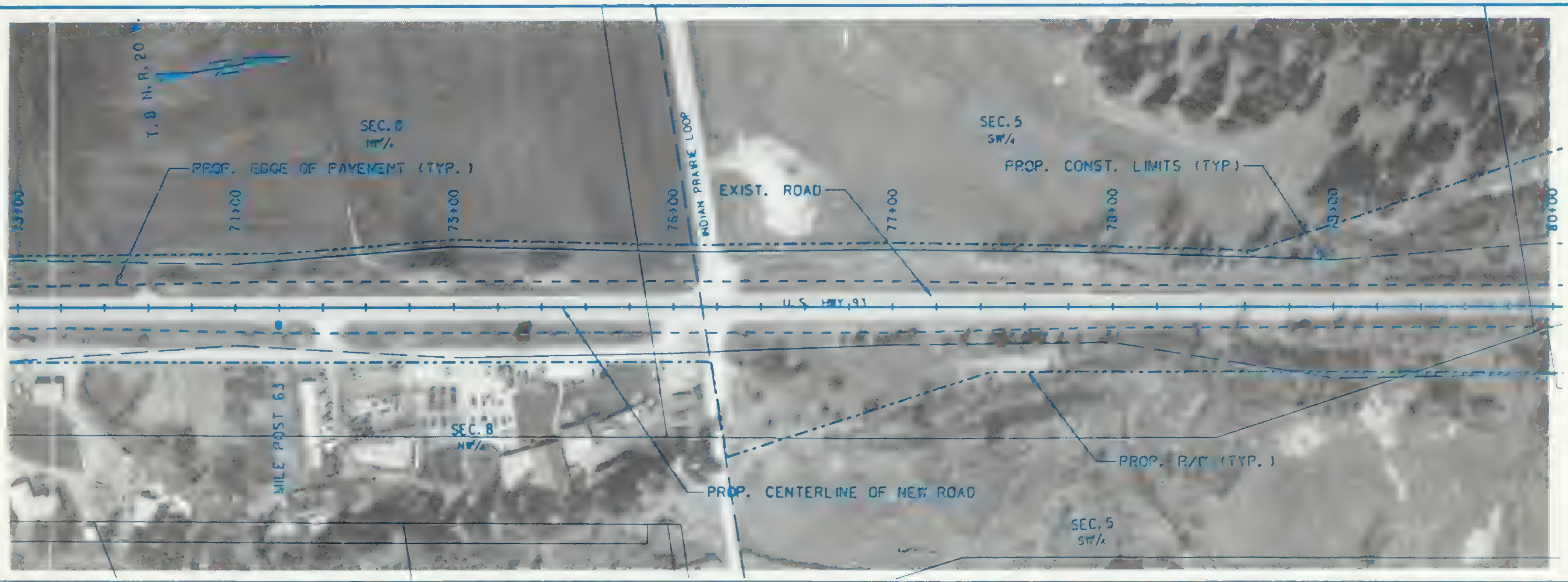




(4-Lane)
(4-Lane To 5-Lane To 4-Lane)

VICTOR - FLORENCE

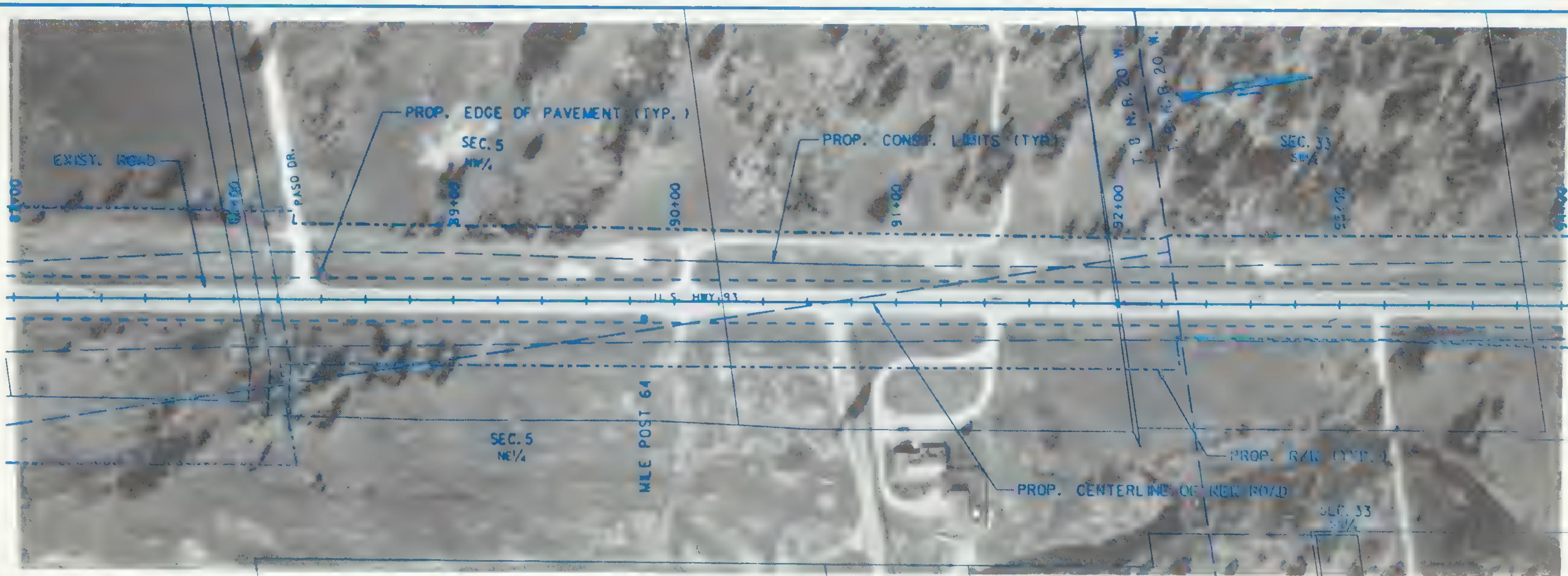
0 m 50 m 100 m

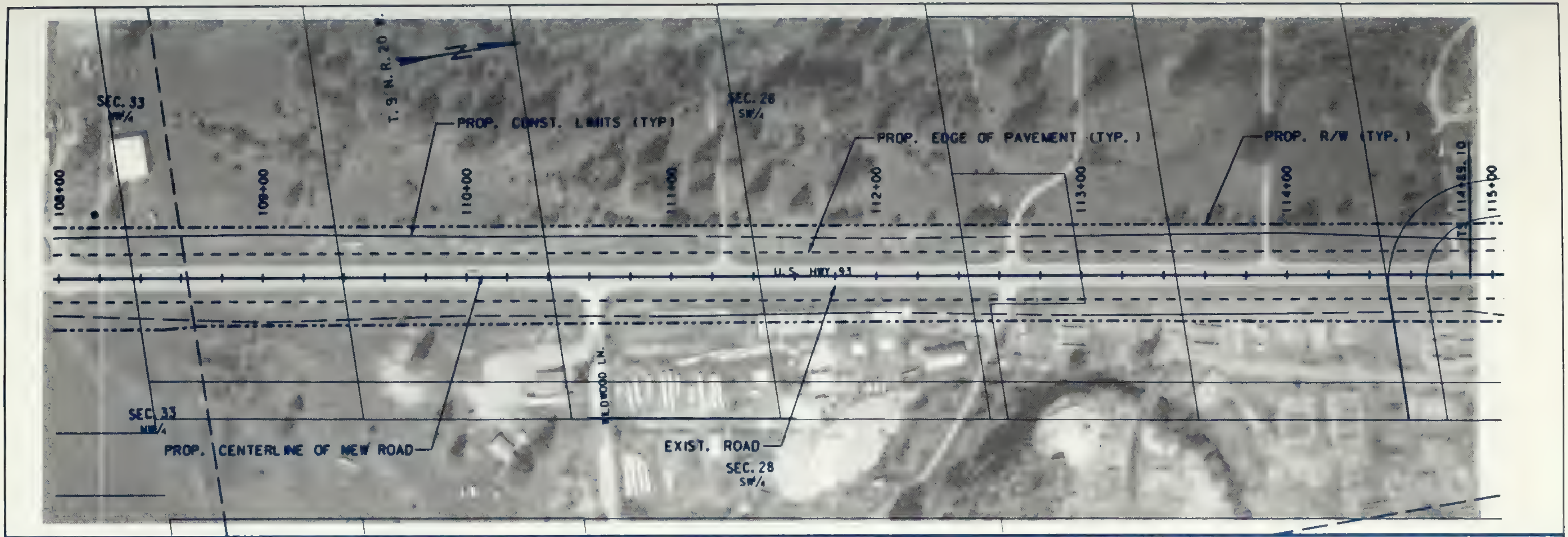


(4-Lane To 5-Lane To 4-Lane)
(4-Lane)

VICTOR - FLORENCE

0 m 50 m 100 m

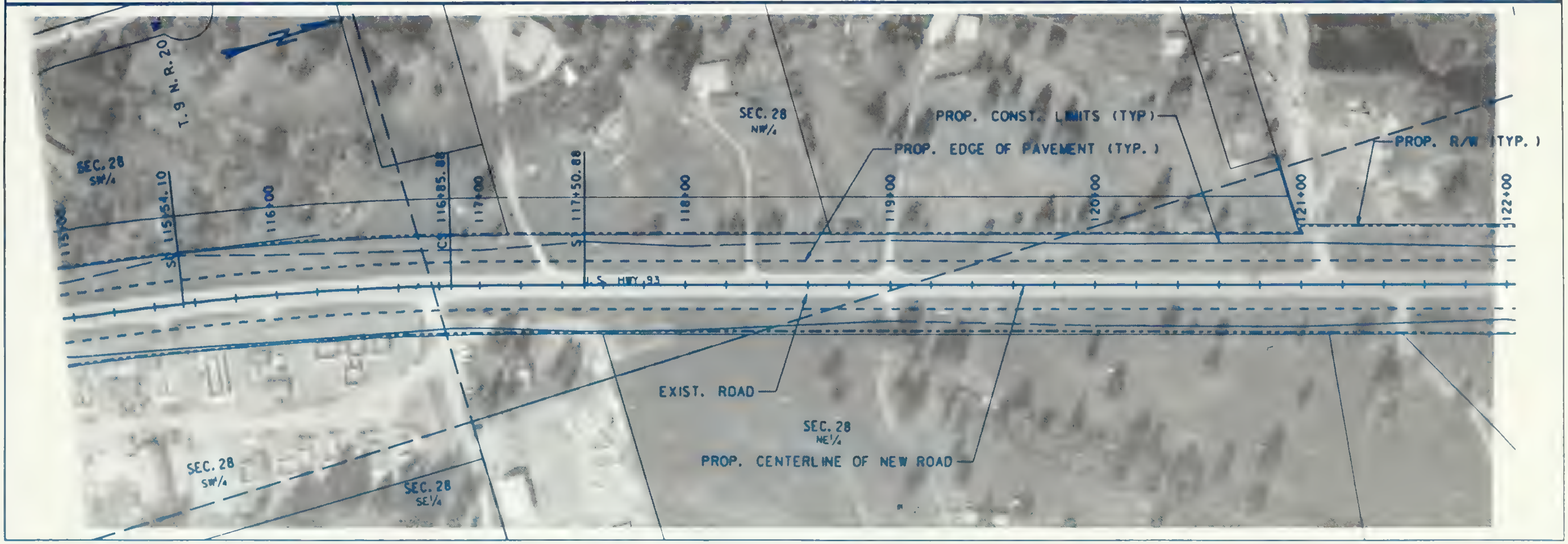


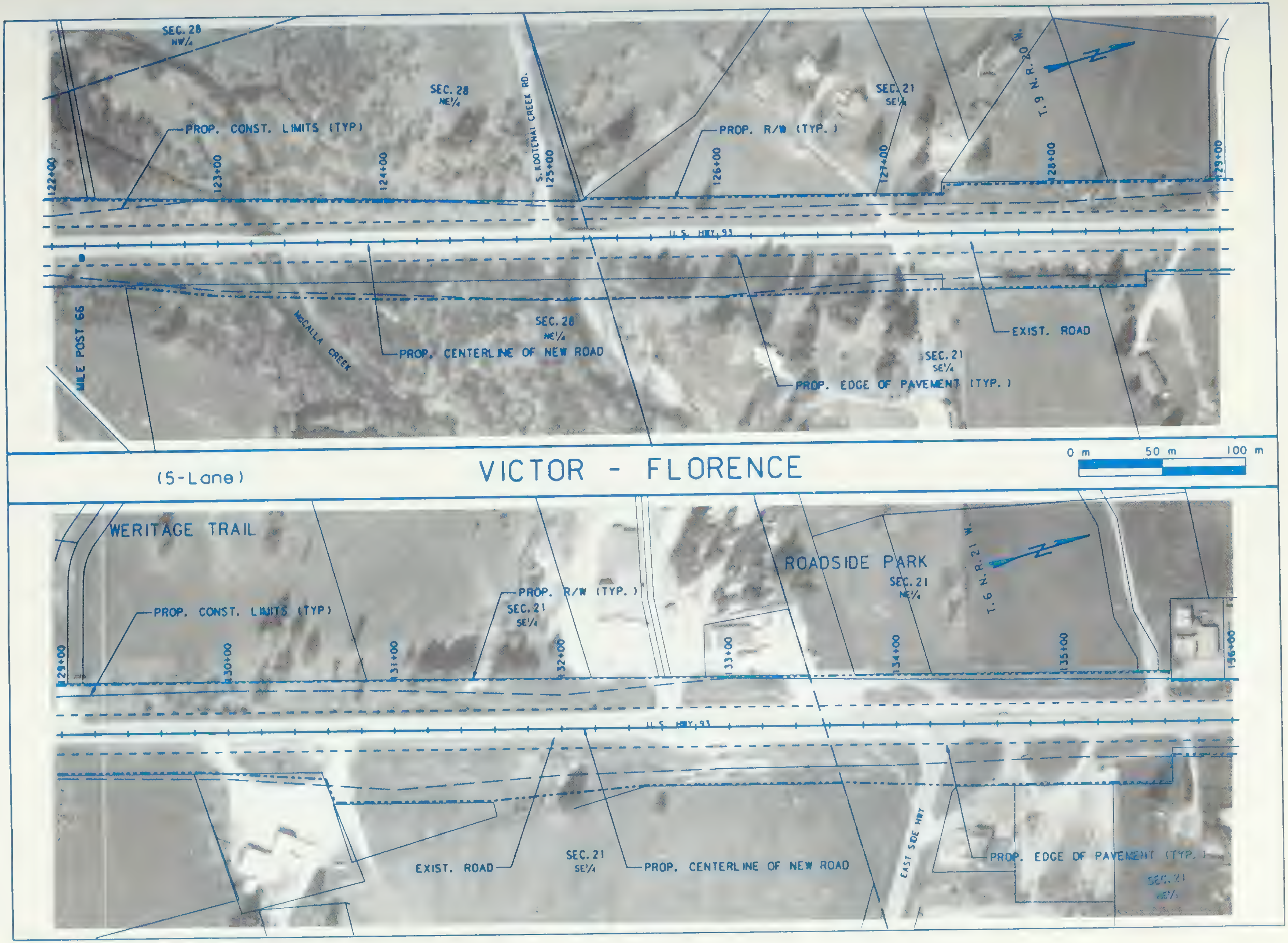


(5-Lane)

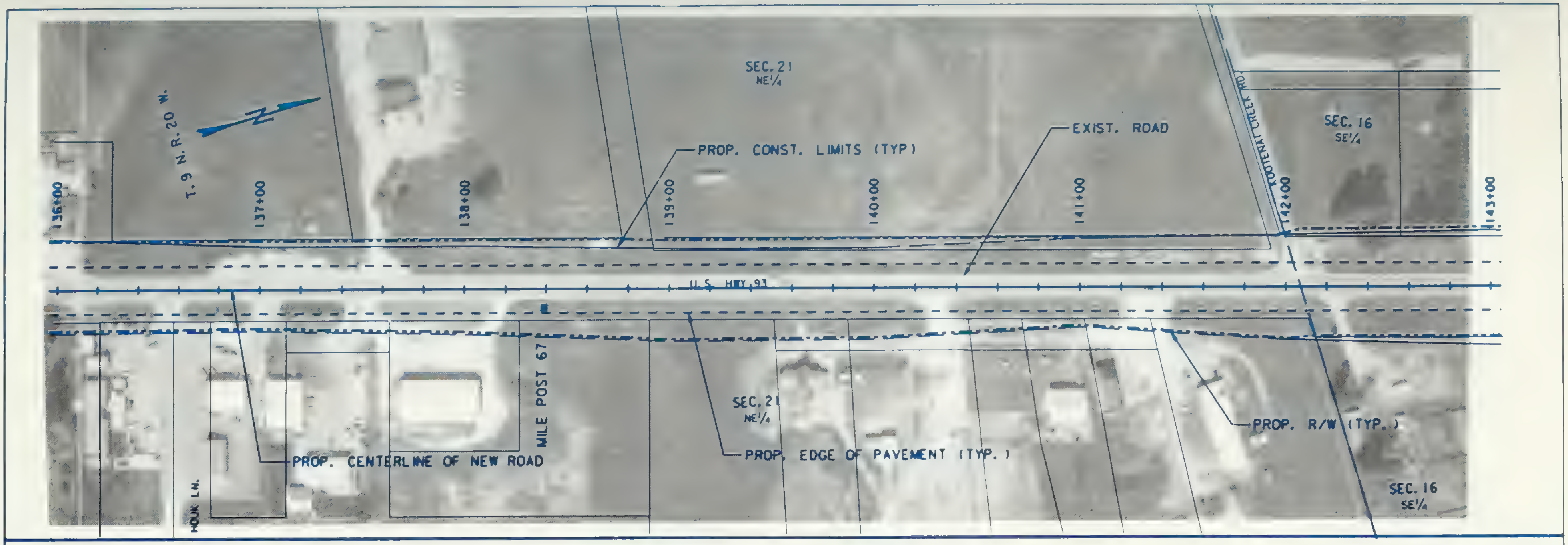
VICTOR - FLORENCE

0 m
50 m
100 m





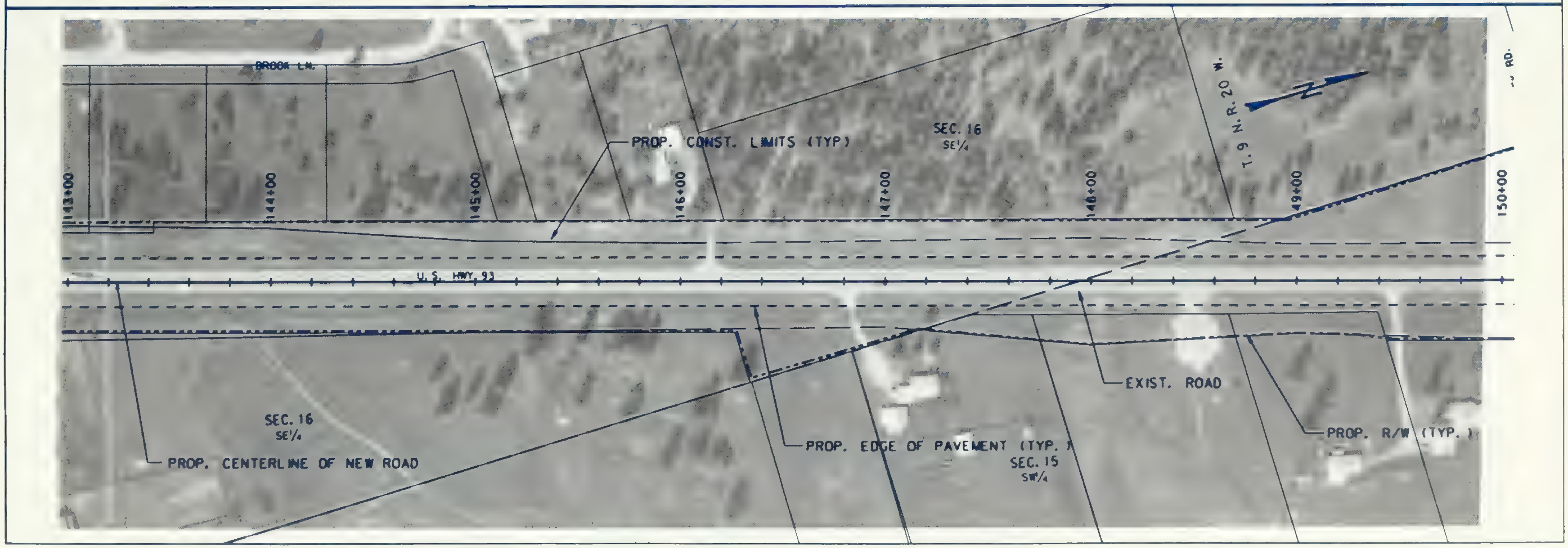
VICTOR - FLORENCE
(5-Lane)
0 m
50 m
100 m
SEC. 28 NW¼
SEC. 28 NE¼
SEC. 21 SE¼
T.9 N.R.20 W.
PROP. CONST. LIMITS (TYP)
PROP. R/W (TYP.)
S.KOOTENAI CREEK RD.
122+00
123+00
124+00
125+00
126+00
127+00
128+00
129+00
U.S. HWY. 93
MILE POST 66
McCALLA CREEK
PROP. CENTERLINE OF NEW ROAD
SEC. 28 NE¼
SEC. 21 SE¼
EXIST. ROAD
PROP. EDGE OF PAVEMENT (TYP.)
WERITAGE TRAIL
PROP. CONST. LIMITS (TYP)
PROP. R/W (TYP.)
SEC. 21 SE¼
ROADSIDE PARK
SEC. 21 NE¼
T.6 N.R.21 W.
129+00
130+00
131+00
132+00
133+00
134+00
135+00
136+00
U.S. HWY. 93
EXIST. ROAD
SEC. 21 SE¼
PROP. CENTERLINE OF NEW ROAD
EAST SIDE HWY
PROP. EDGE OF PAVEMENT (TYP.)
SEC. 21 NE¼

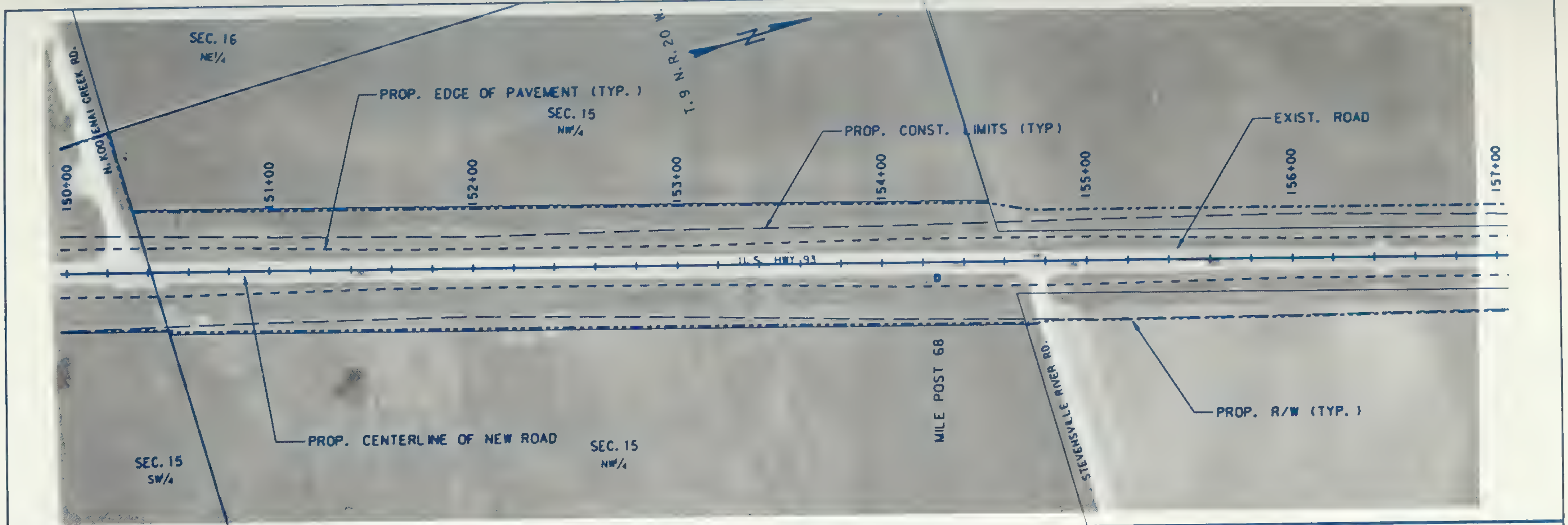


(5-Lane)

VICTOR - FLORENCE

0 m 50 m 100 m

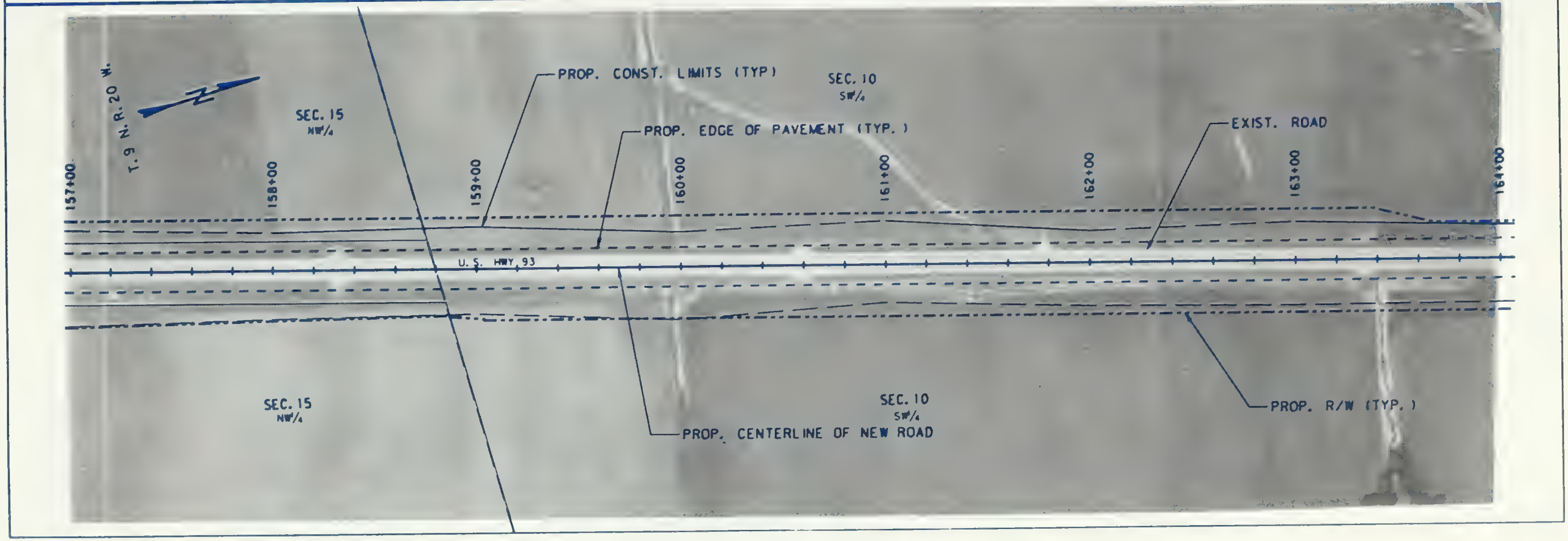




(5-Lane To 4-Lane To 5-Lane To 4-Lane)
(4-Lane)

VICTOR - FLORENCE

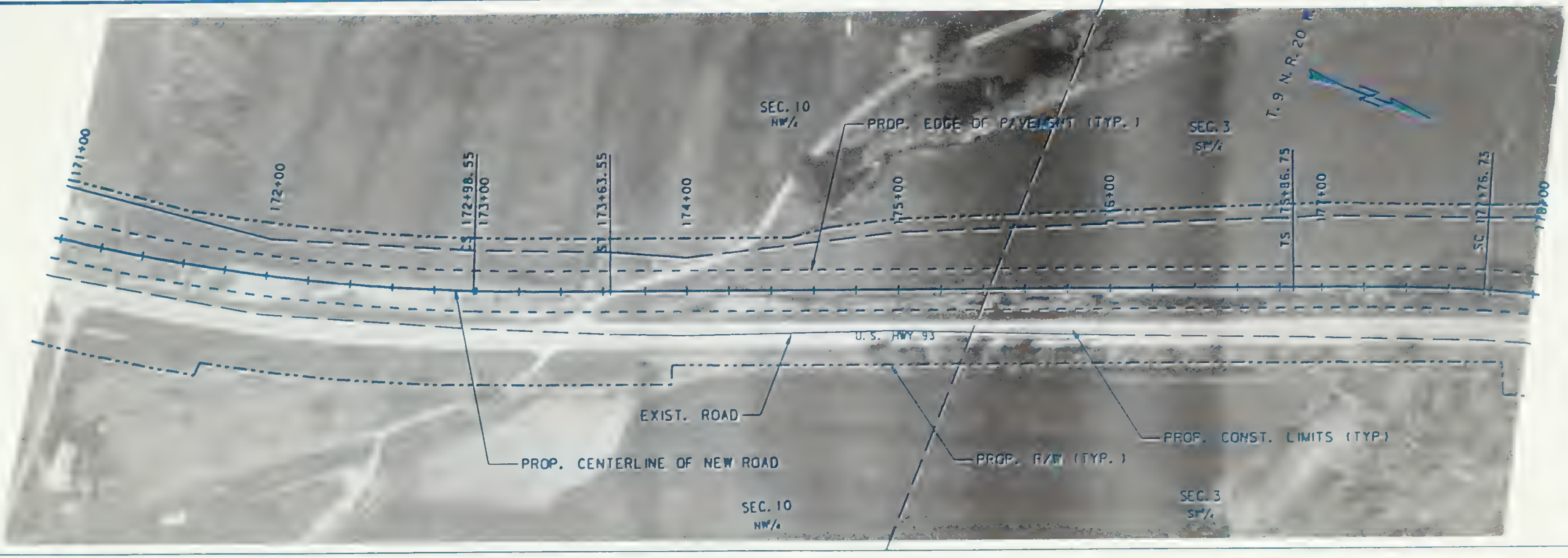
0 m 50 m 100 m

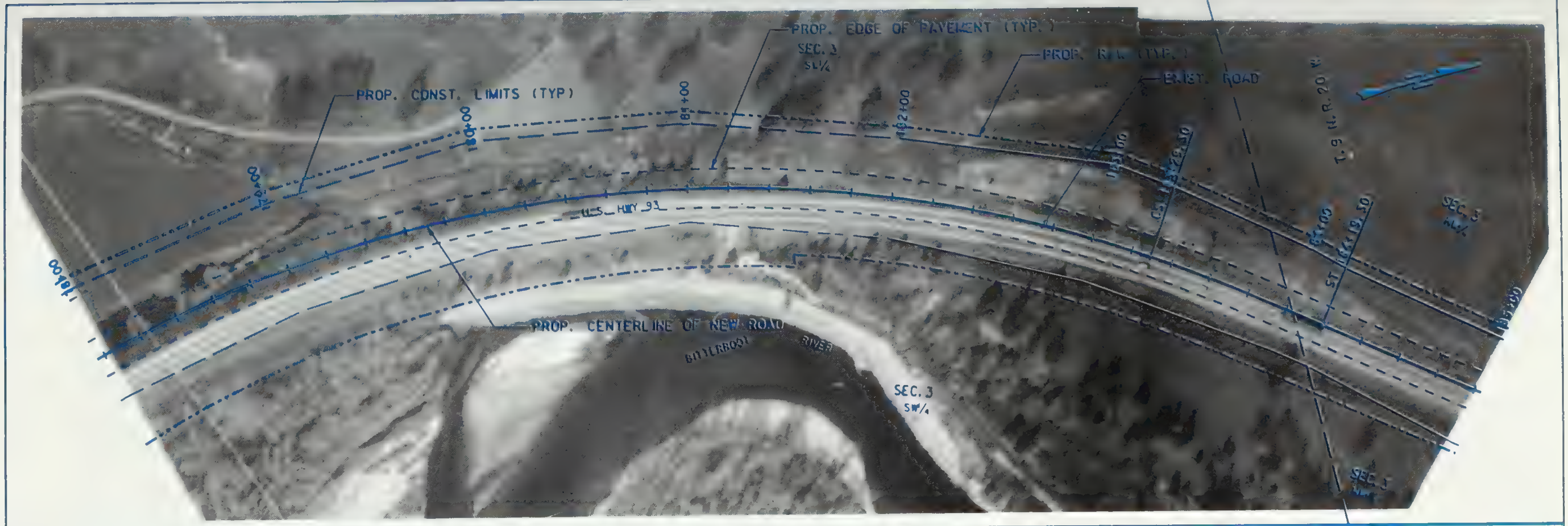


(4-Lane To 5-Lane to 4-Lane)
(4-Lane)

VICTOR - FLORENCE

0 m 50 m 100 m

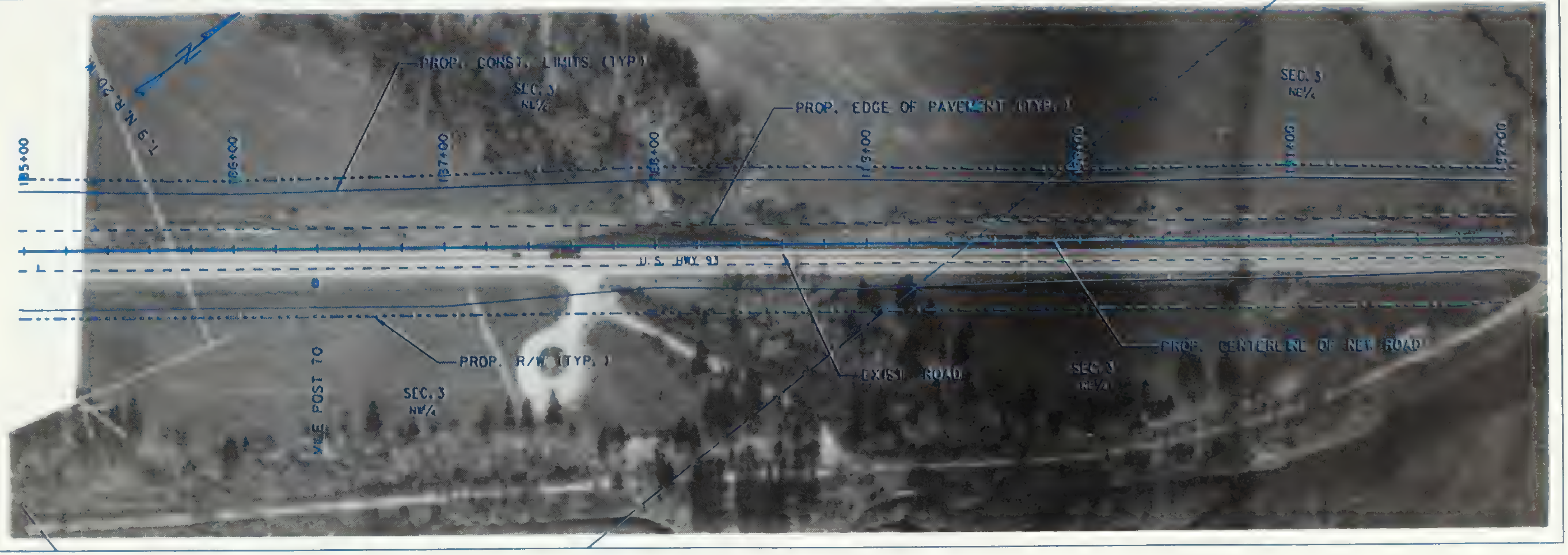


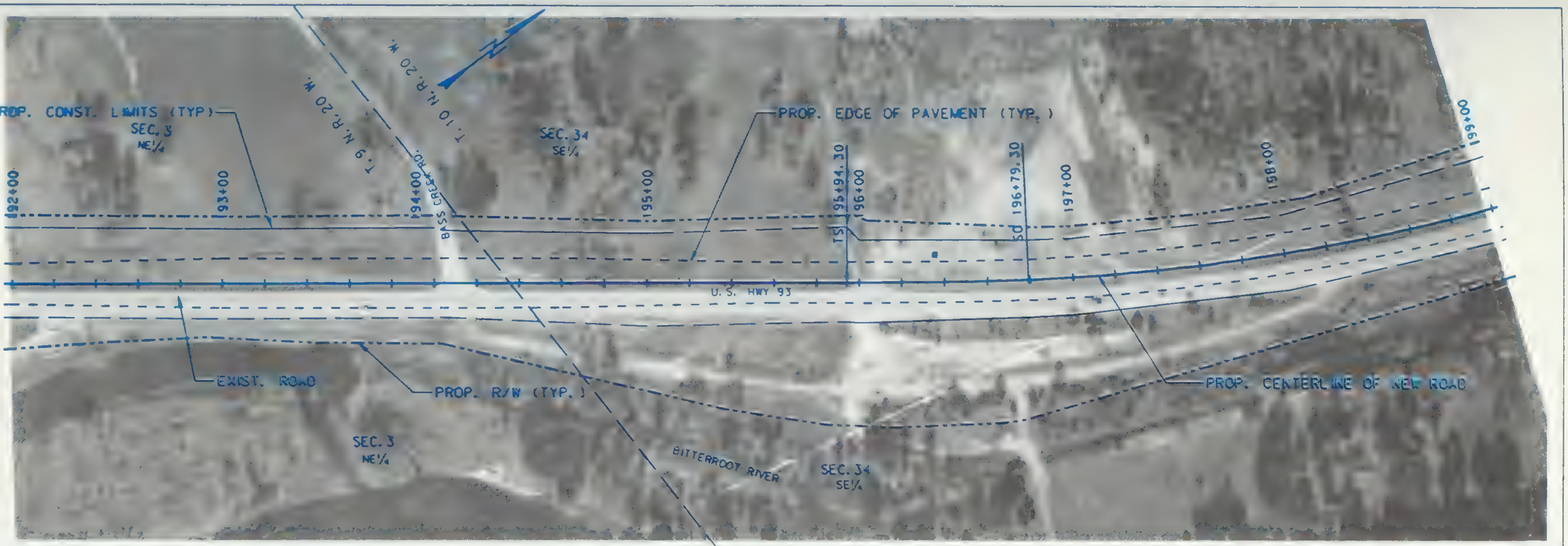


(4-Lane)

VICTOR - FLORENCE

0 m 50 m 100 m





(4-Lane To 5-Lane To 4-Lane)
(4-Lane)

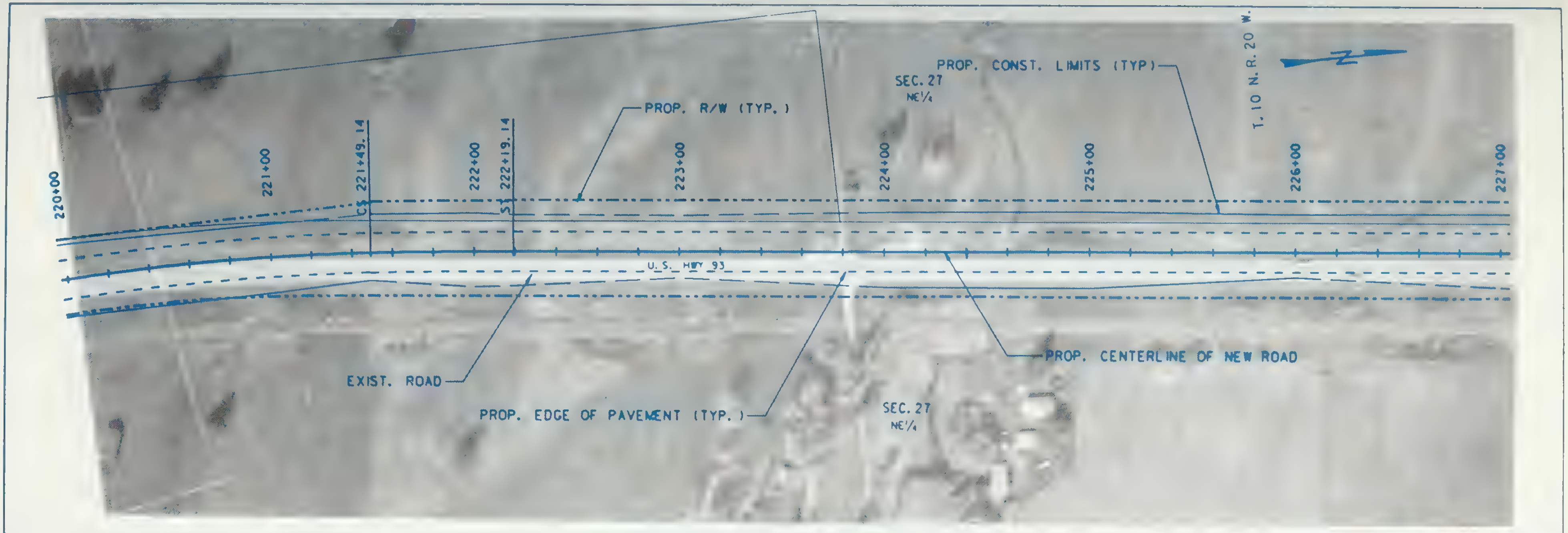
VICTOR - FLORENCE

0 m 50 m 100 m

(4-Lane)

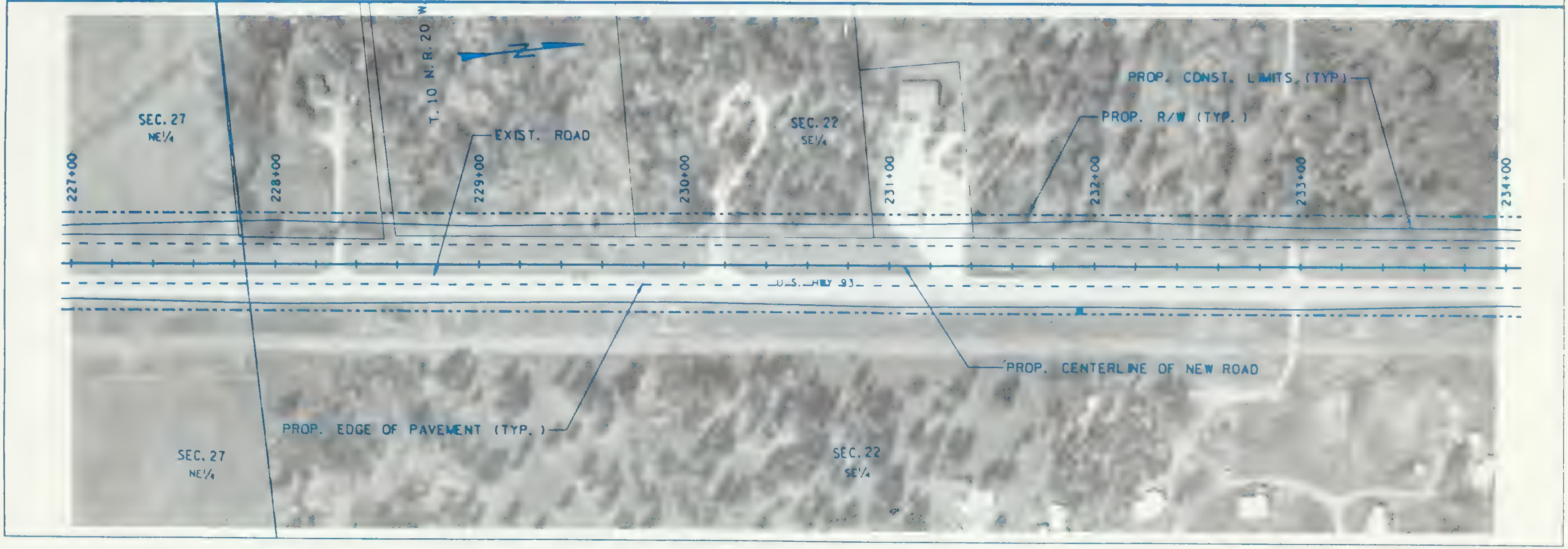
VICTOR - FLORENCE

0 m 50 m 100 m

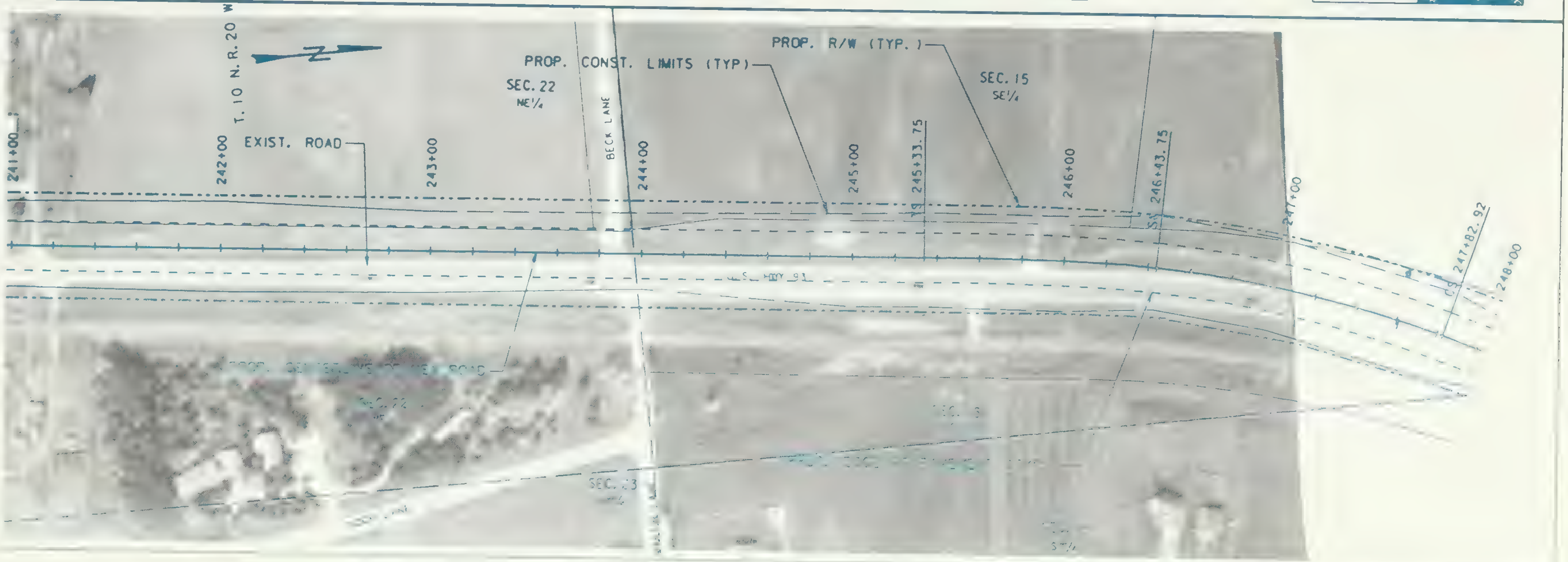


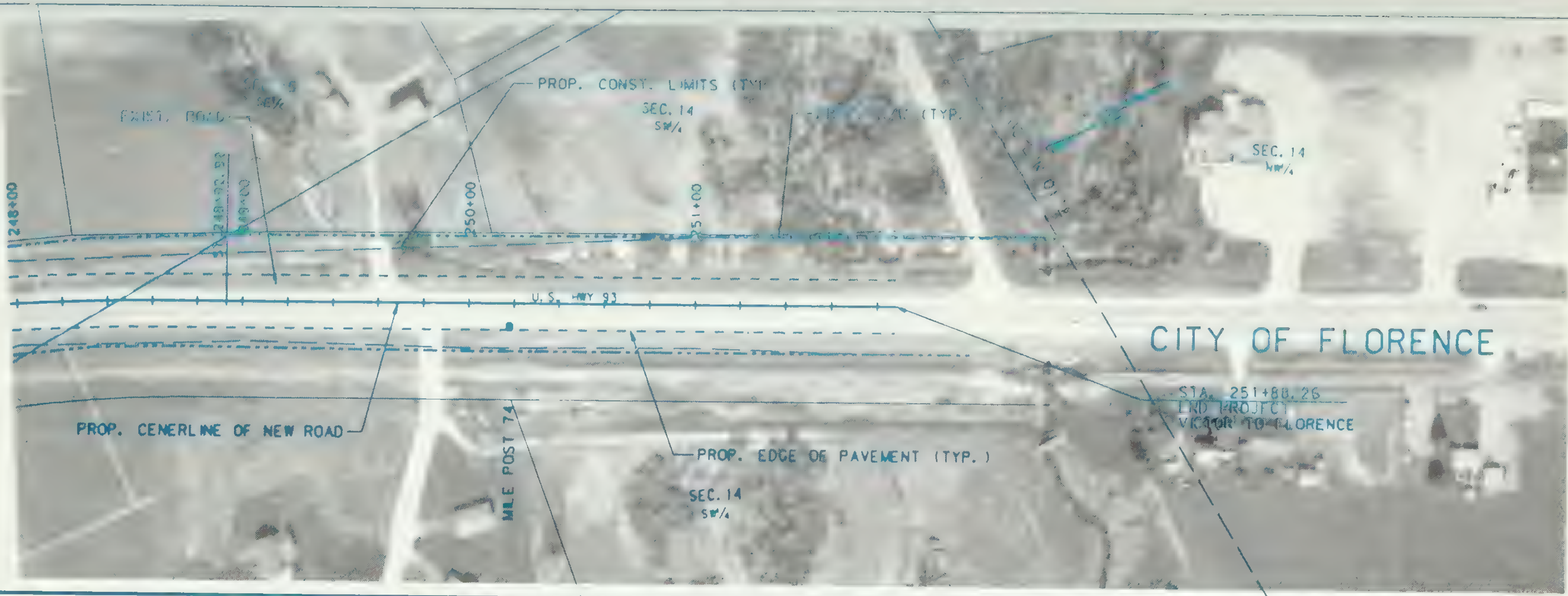
(4-Lane) VICTOR - FLORENCE

0 m 50 m 100 m



(4-Lane To 5-Lane) VICTOR - FLORENCE



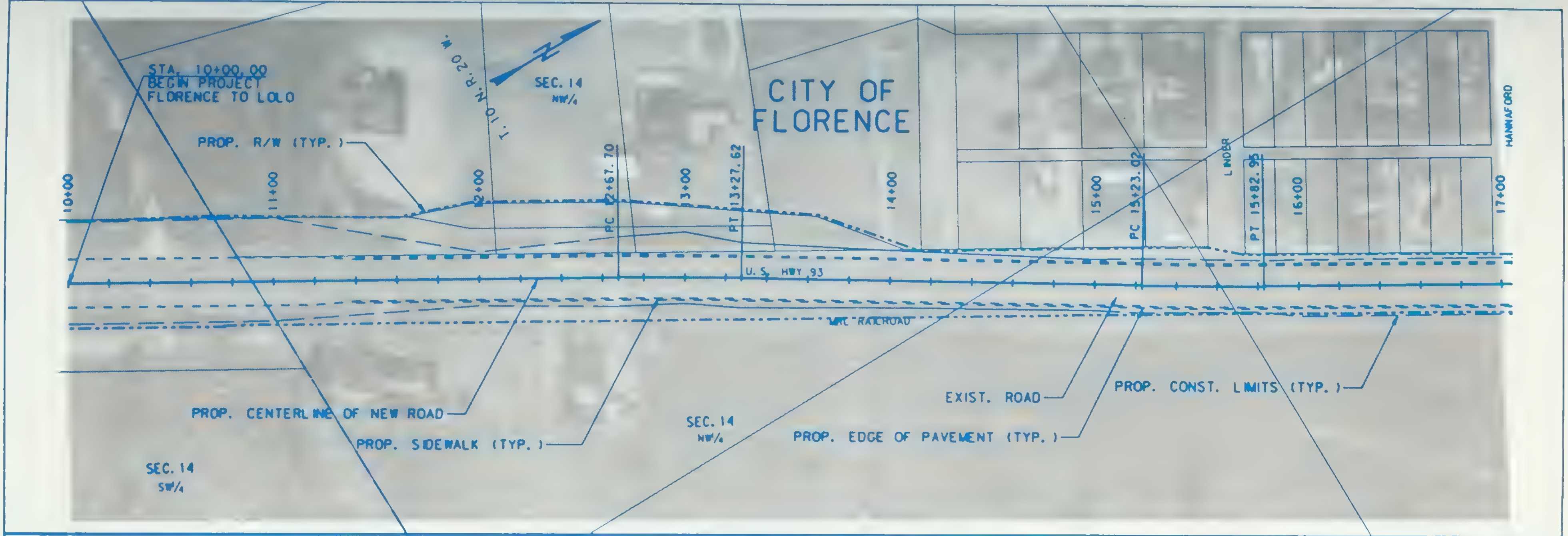


(5-Lane)

VICTOR - FLORENCE

0 m 50 m 100 m

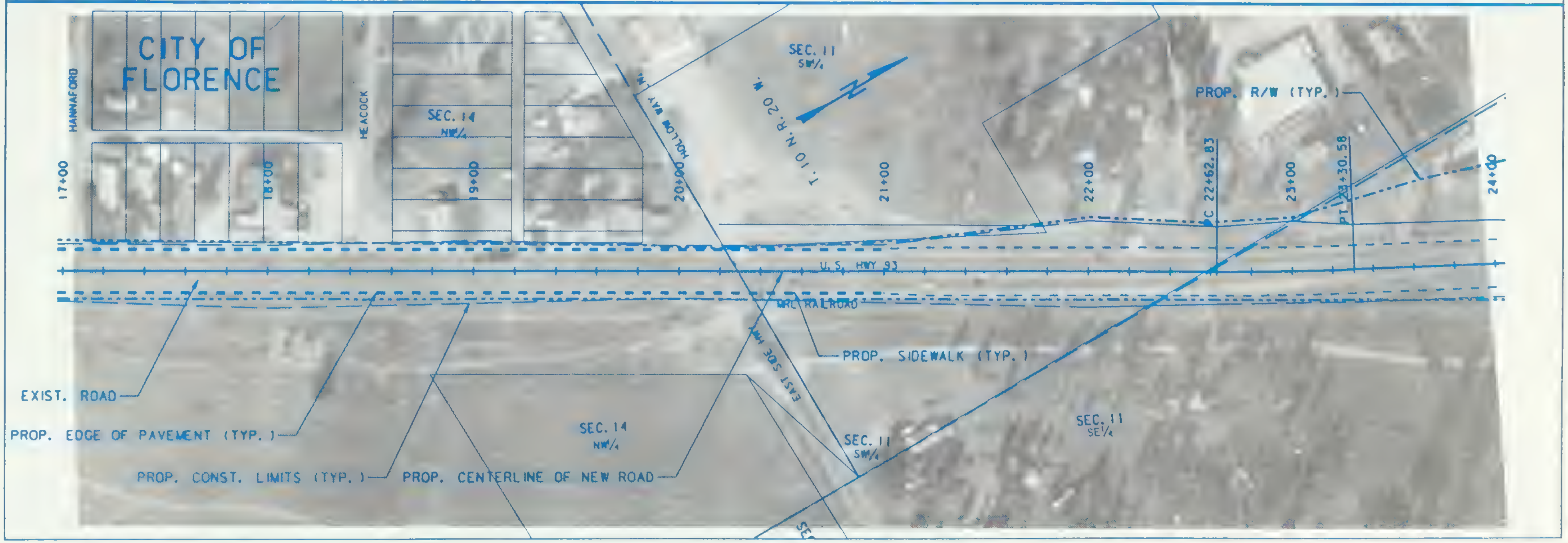
FLORENCE - LOLO

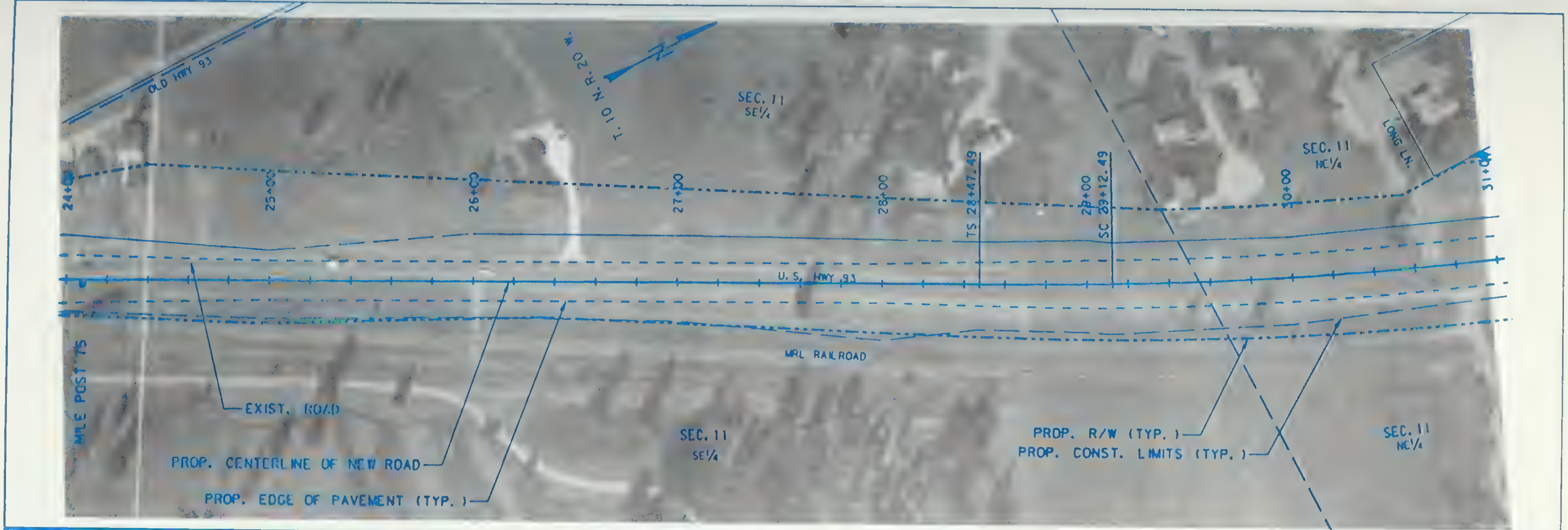


(5-Lane To 5-Lane Urban)
(5-Lane Urban To 5-Lane)

FLORENCE - LOLO

0 m 50 m 100 m

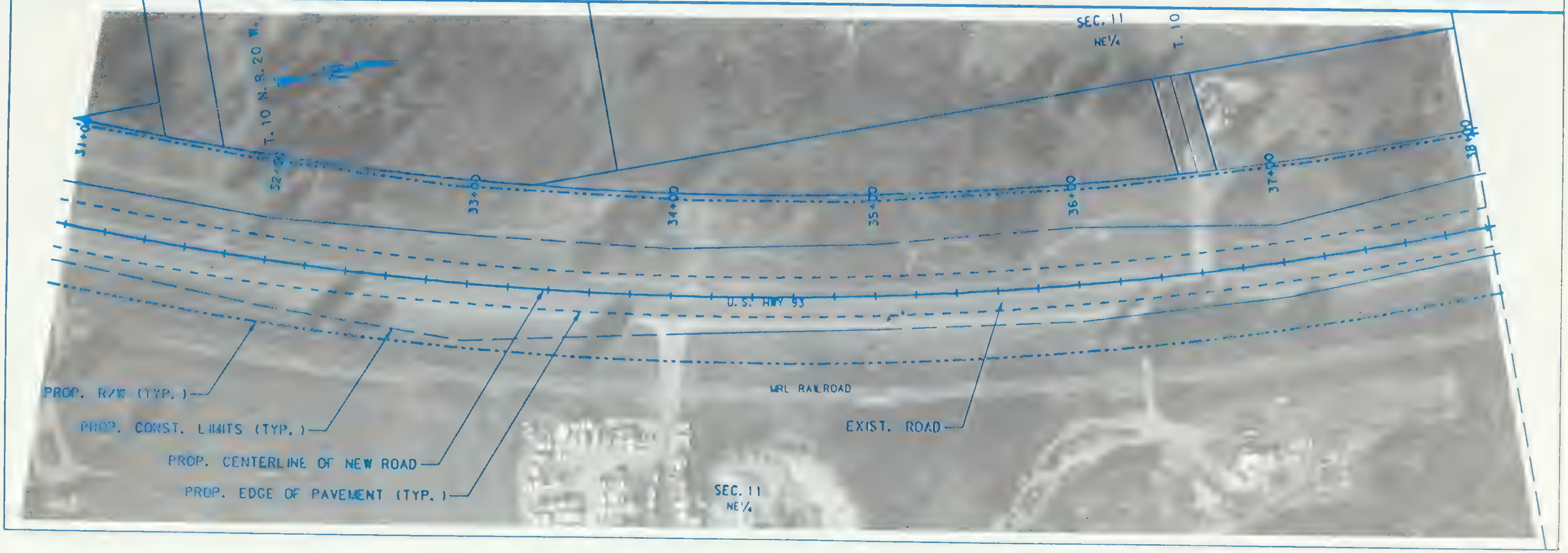


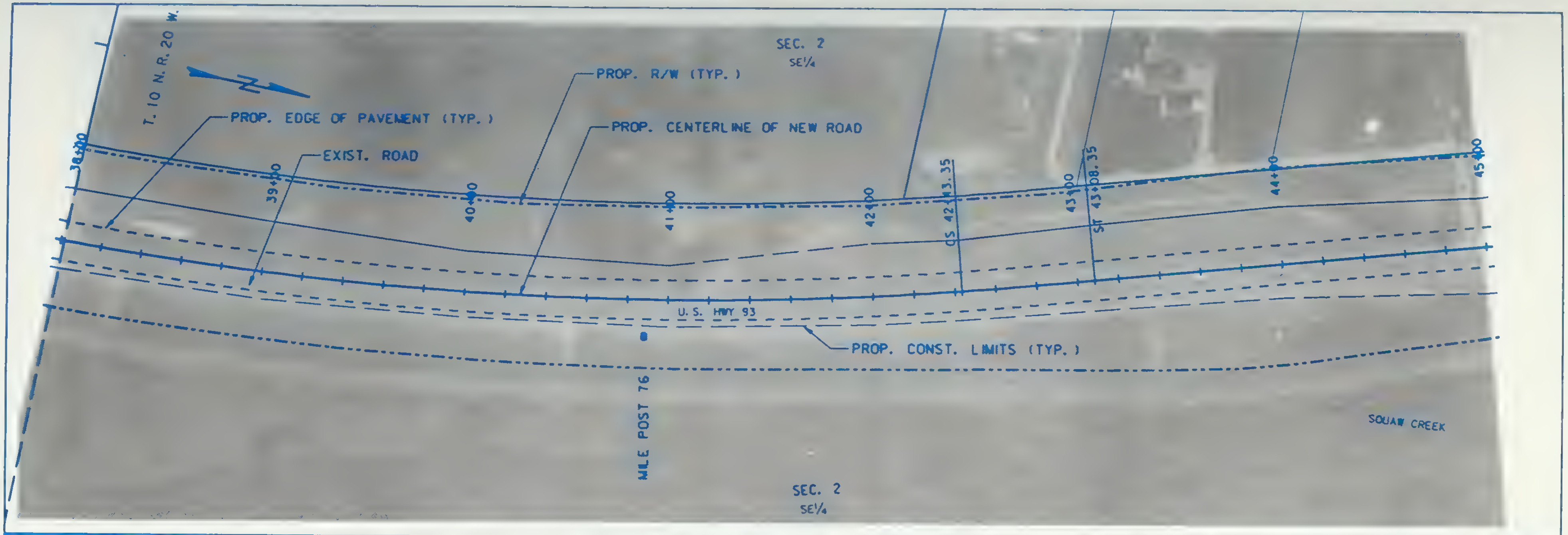


(5-Lane To 4-Lane To 5-Lane)
(5-Lane To 4-Lane)

FLORENCE - LOLO

0 m 50 m 100 m

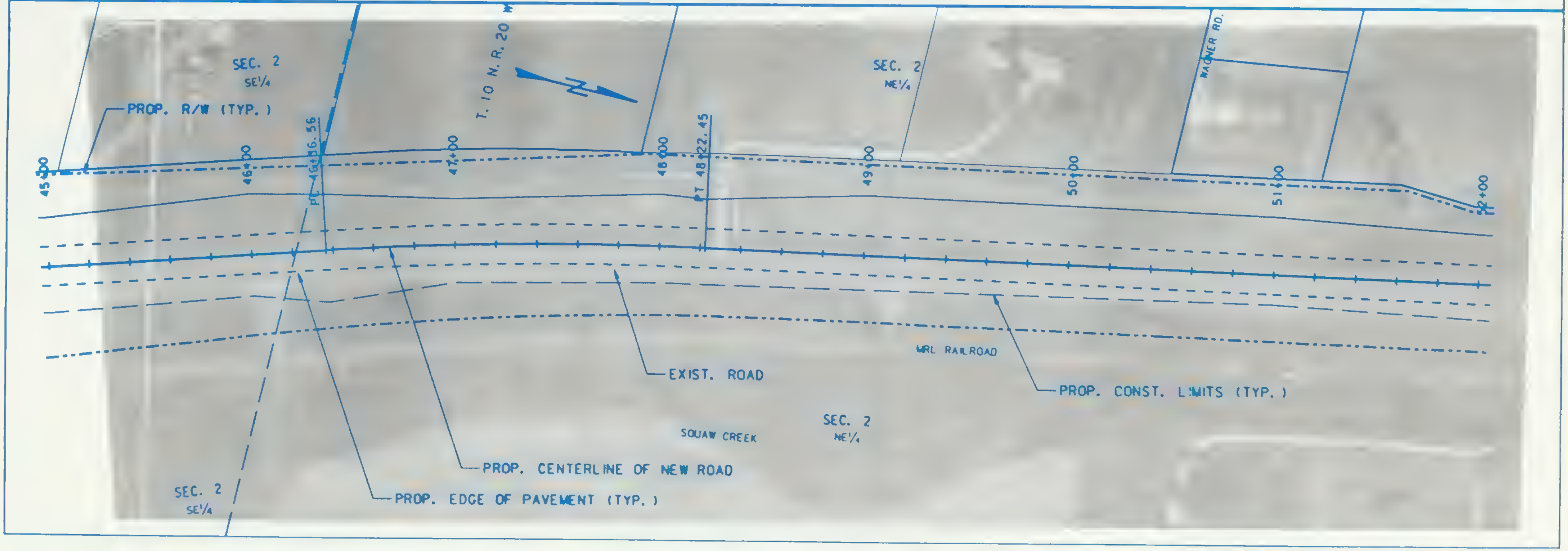


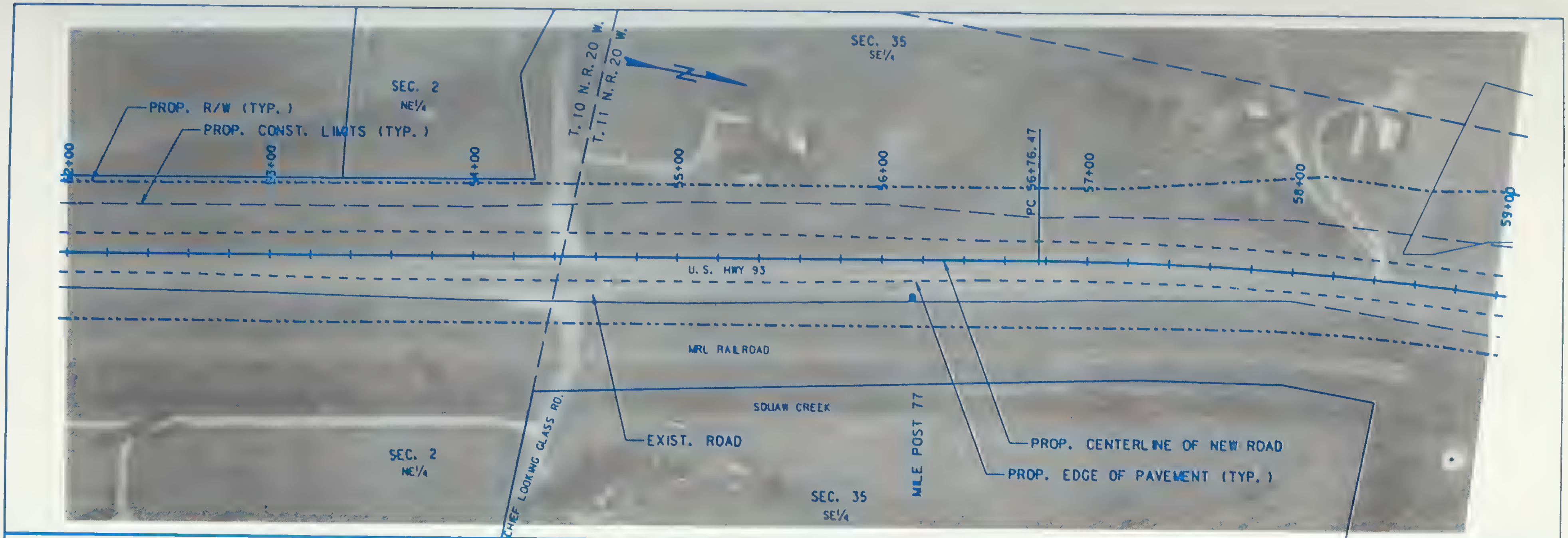


(4-Lane)

FLORENCE - LOLO

0 m 50 m 100 m

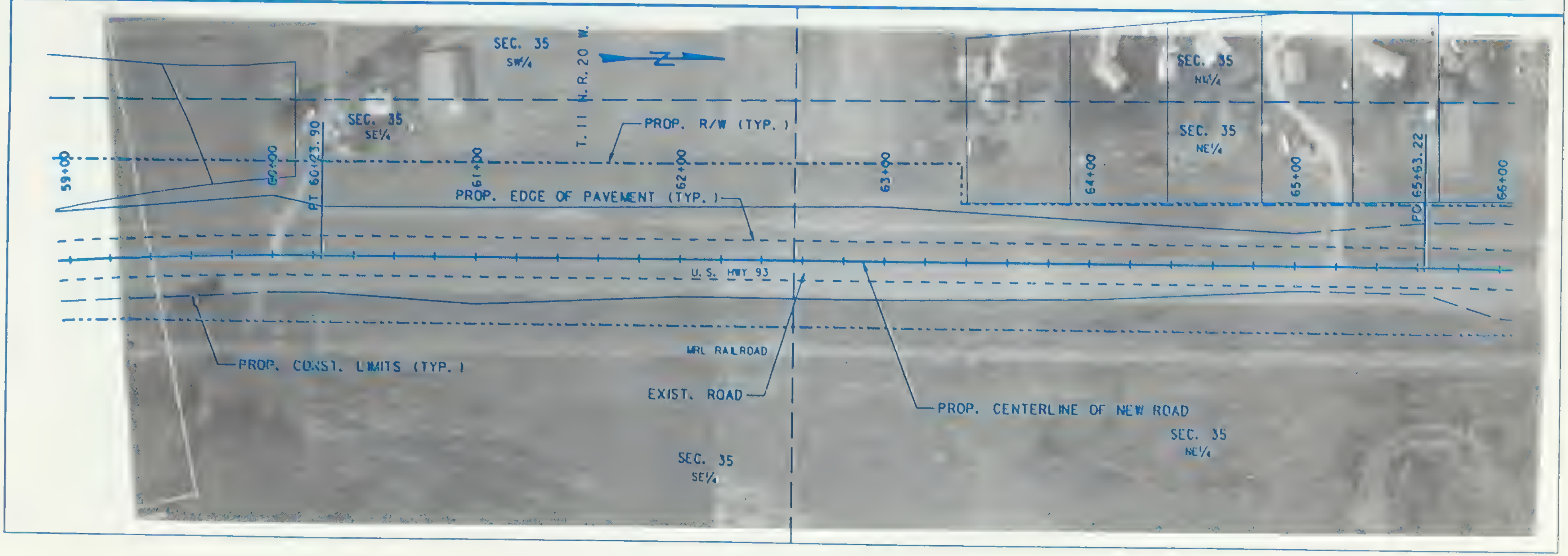


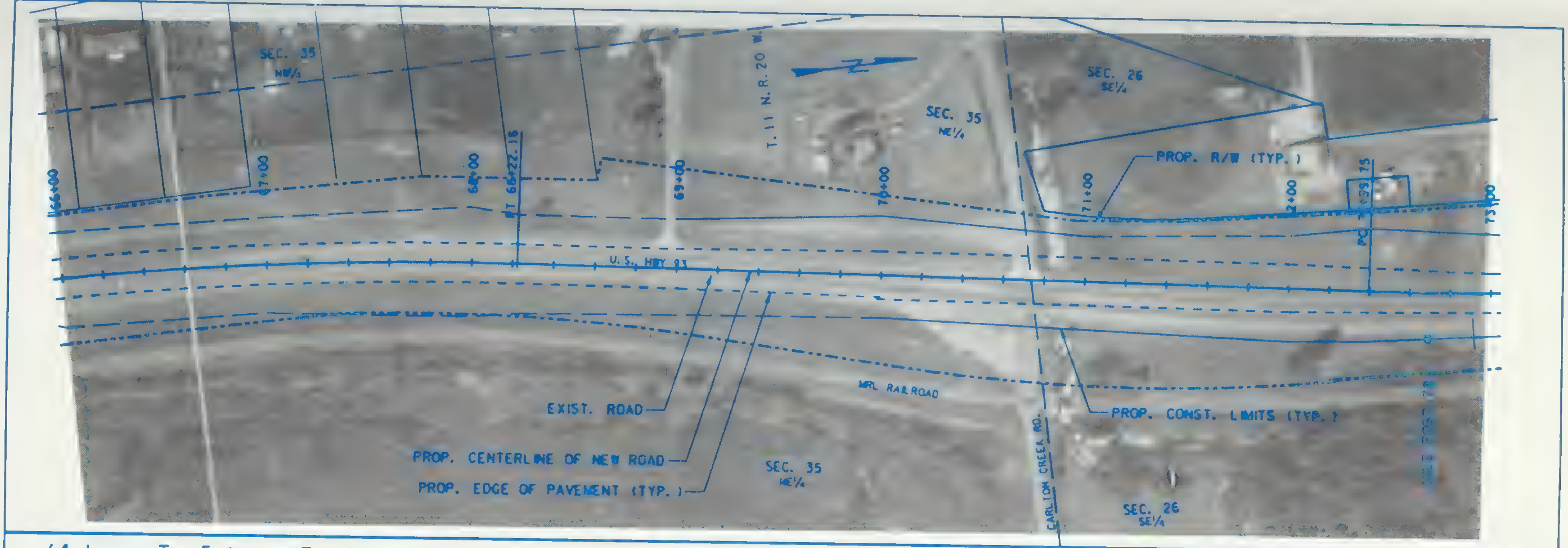


(4-Lane To 5-Lane To 4-Lane)
(4-Lane)

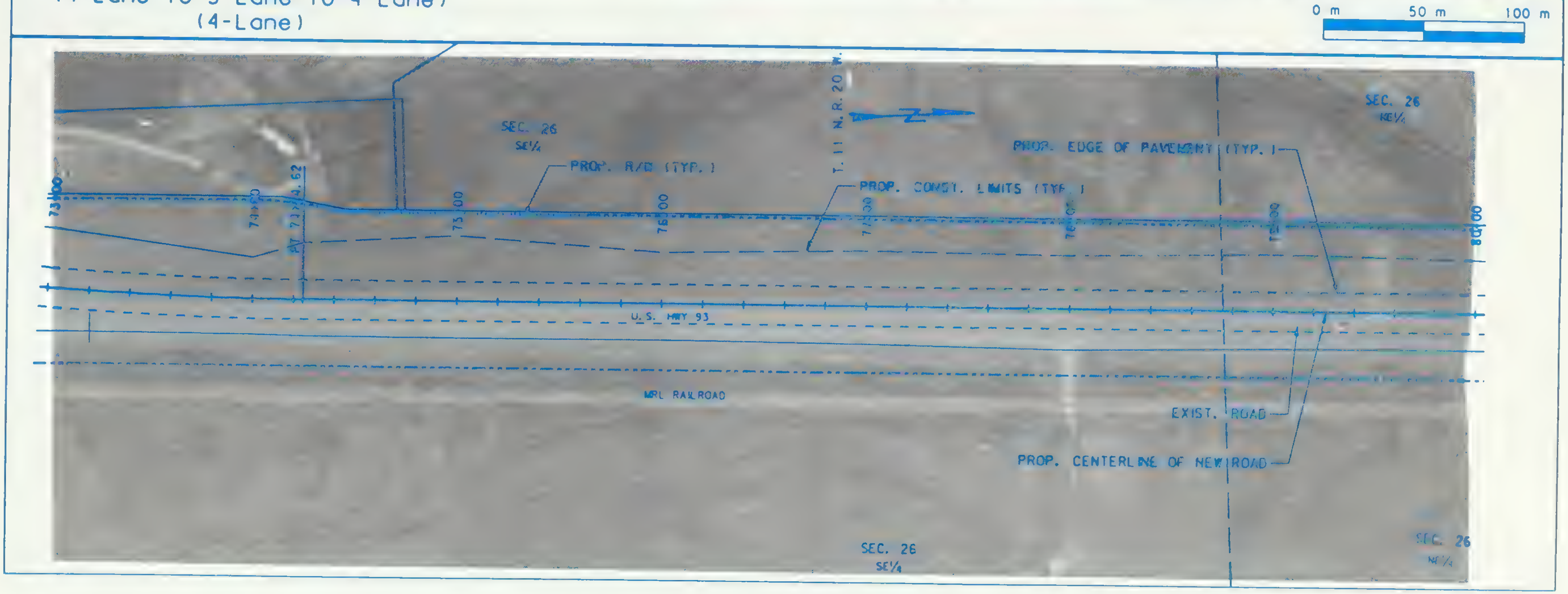
FLORENCE - LOLO

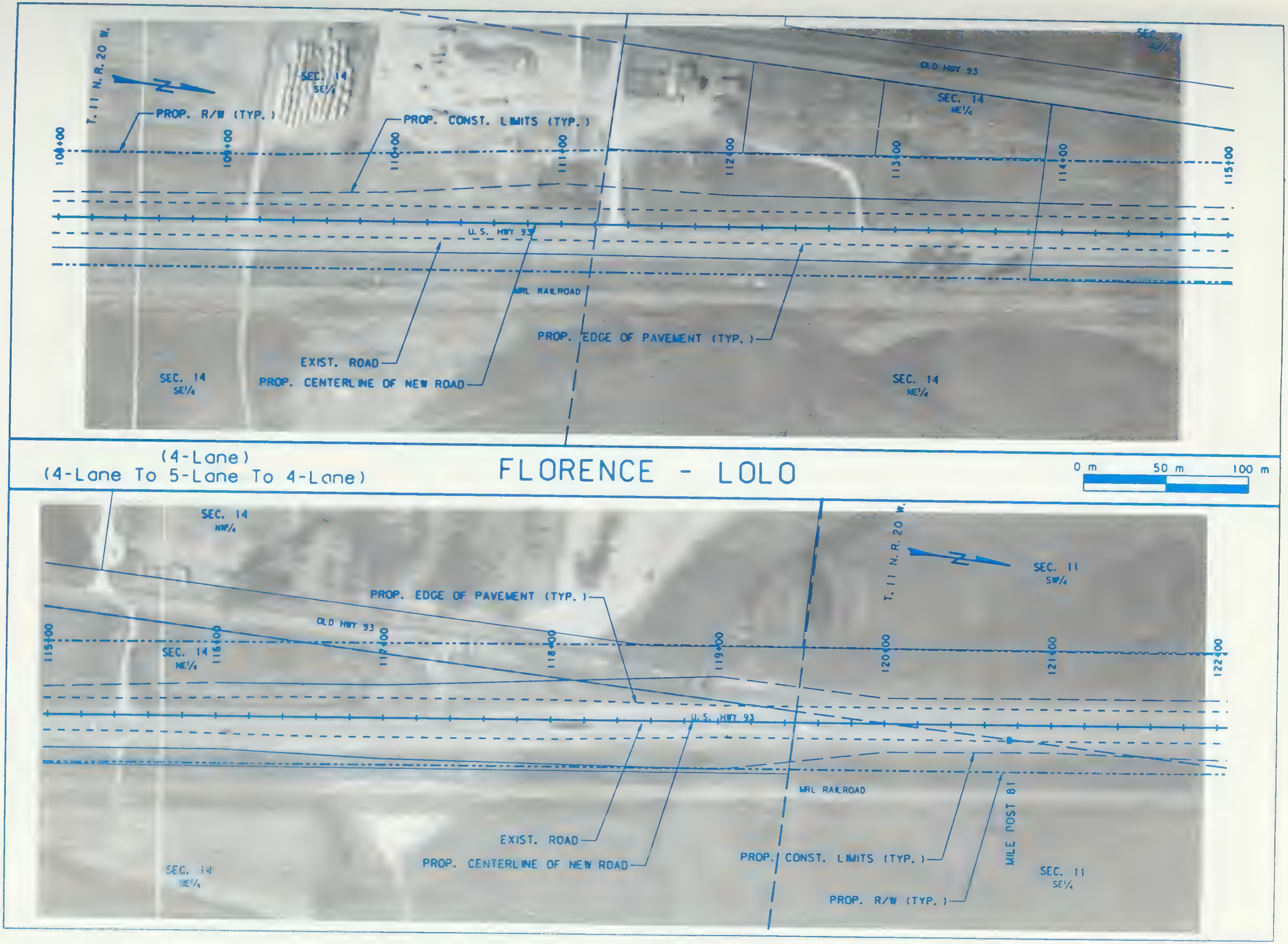
0 m 50 m 100 m

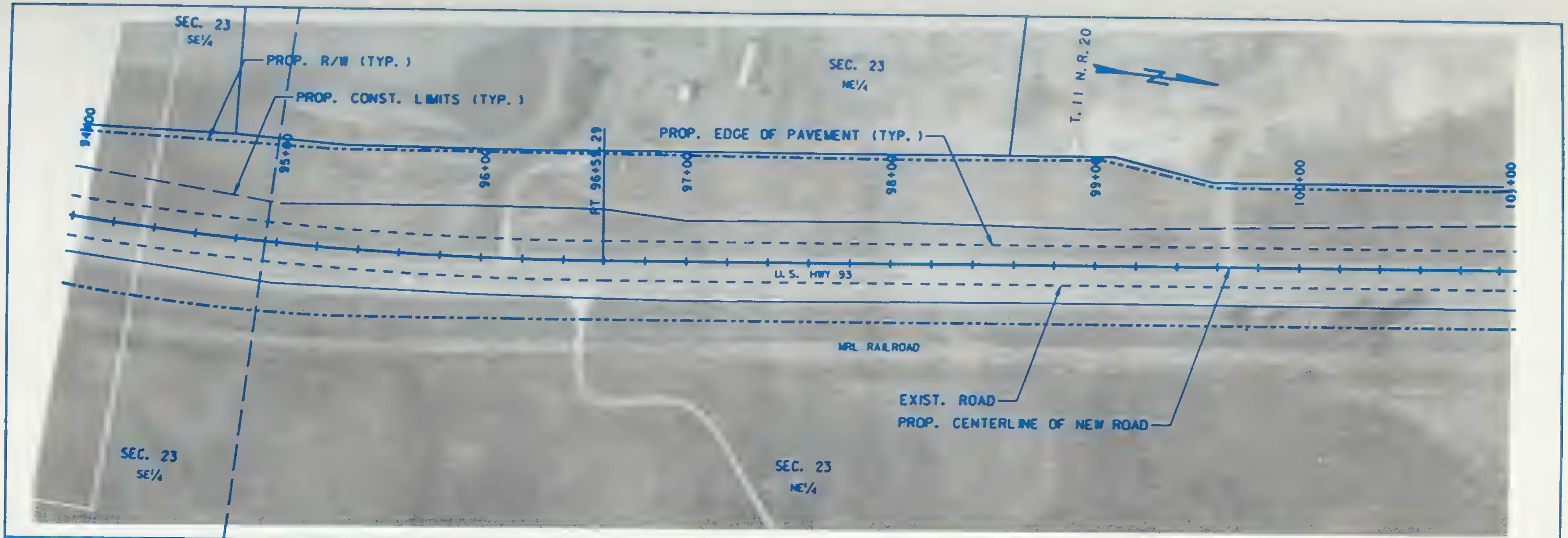




(4-Lane To 5-Lane To 4-Lane)
(4-Lane)



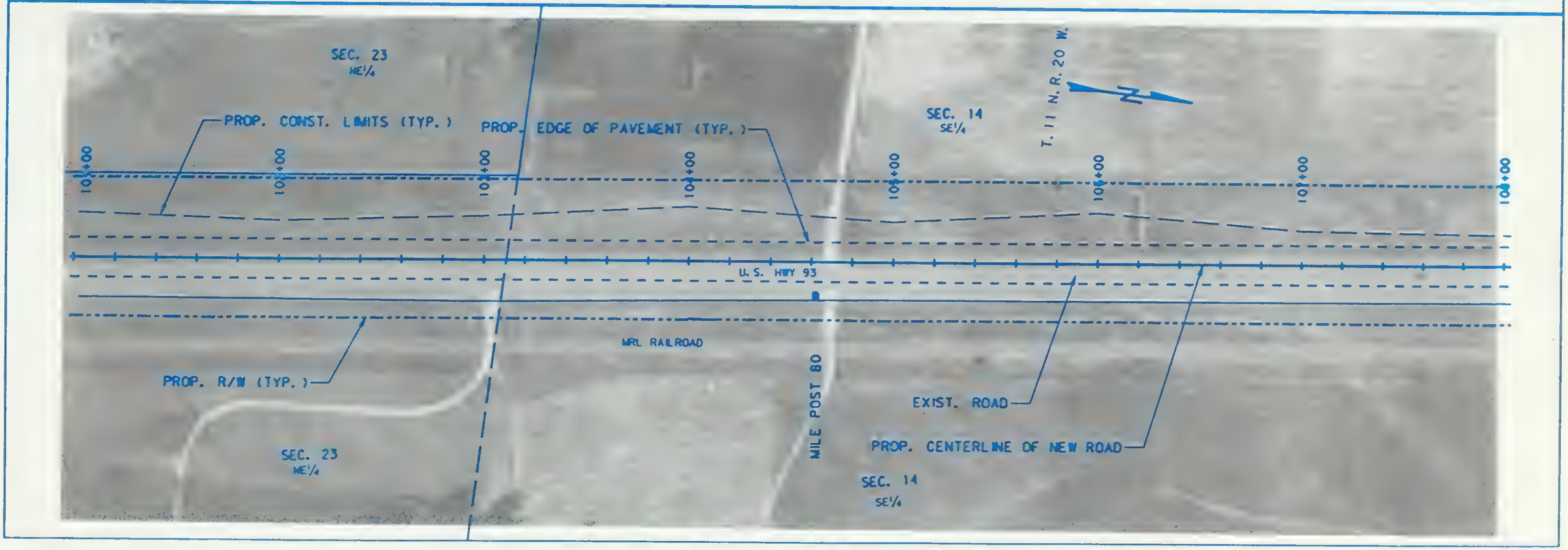

T. 11 N. R. 20 W.
SEC. 14 SE¼
PROP. R/W (TYP.)
PROP. CONST. LIMITS (TYP.)
OLD HWY 93
SEC. 14 NE¼
108+00
109+00
110+00
111+00
112+00
113+00
114+00
115+00
U.S. HWY 93
MRL RAILROAD
PROP. EDGE OF PAVEMENT (TYP.)
EXIST. ROAD
PROP. CENTERLINE OF NEW ROAD
SEC. 14 SE¼
SEC. 14 NE¼
(4-Lane)
(4-Lane To 5-Lane To 4-Lane)
FLORENCE - LOLO
0 m
50 m
100 m
SEC. 14 NW¼
PROP. EDGE OF PAVEMENT (TYP.)
OLD HWY 93
T. 11 N. R. 20 W.
SEC. 11 SW¼
SEC. 14 NE¼
115+00
116+00
117+00
118+00
119+00
120+00
121+00
122+00
U.S. HWY 93
MRL RAILROAD
MILE POST 81
EXIST. ROAD
PROP. CENTERLINE OF NEW ROAD
PROP. CONST. LIMITS (TYP.)
PROP. R/W (TYP.)
SEC. 14 NE¼
SEC. 11 SE¼



(4-Lane)

FLORENCE - LOLO

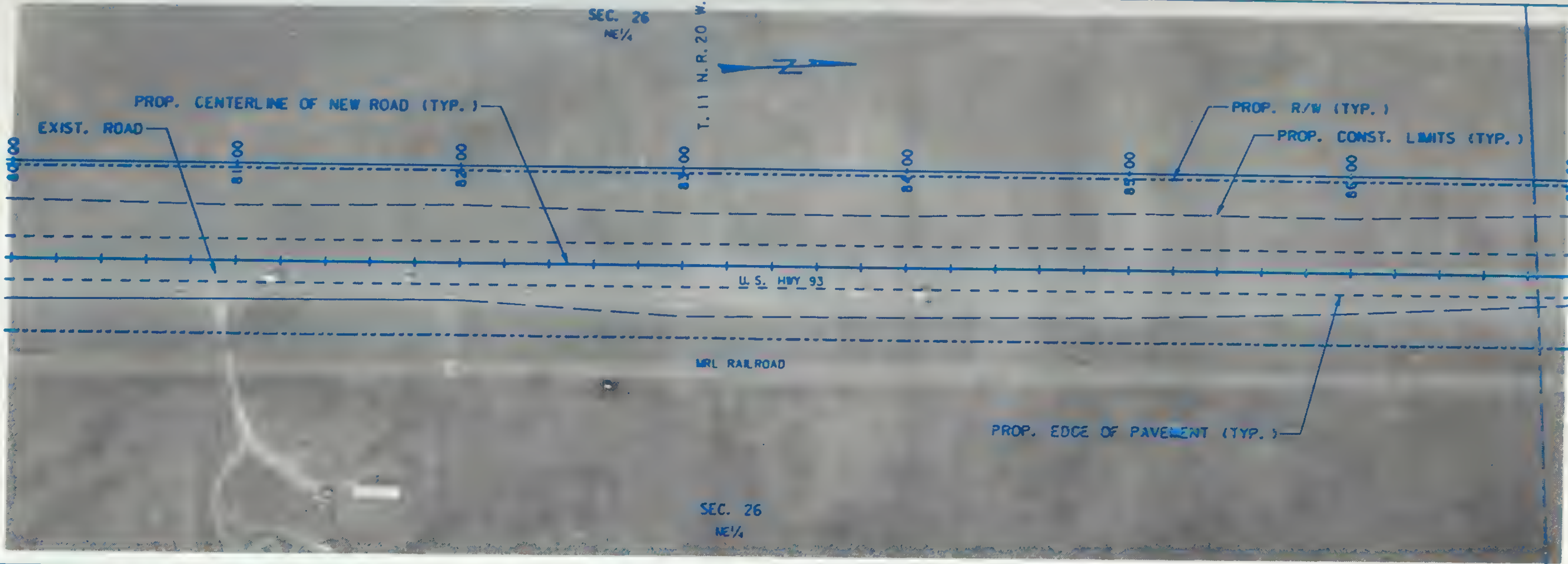
0 m 50 m 100 m

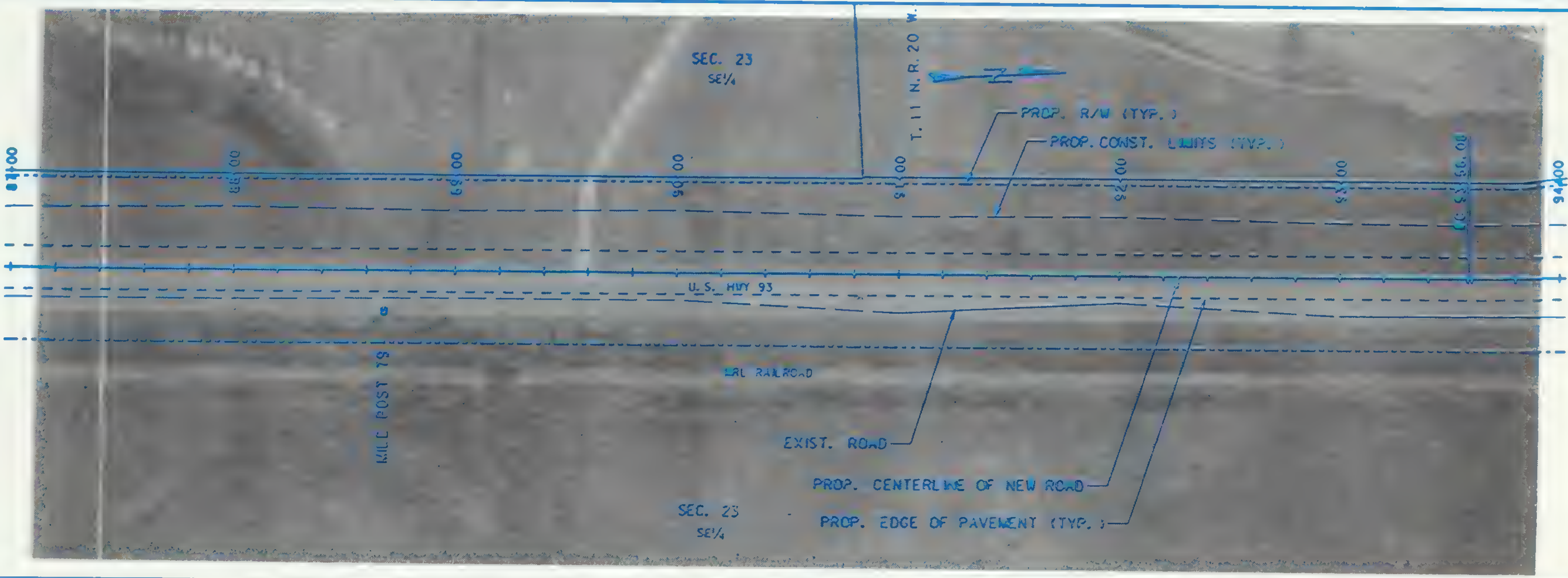


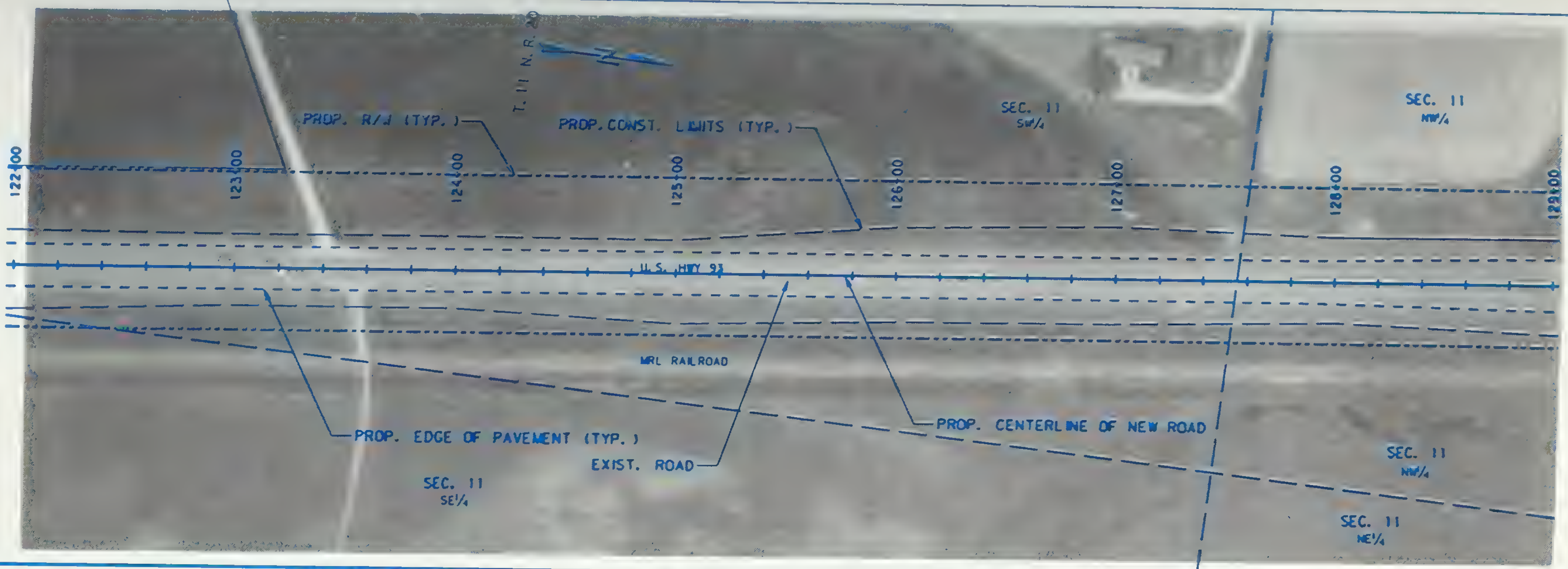
(4-Lane)

FLORENCE - LOLO

0 m 50 m 100 m



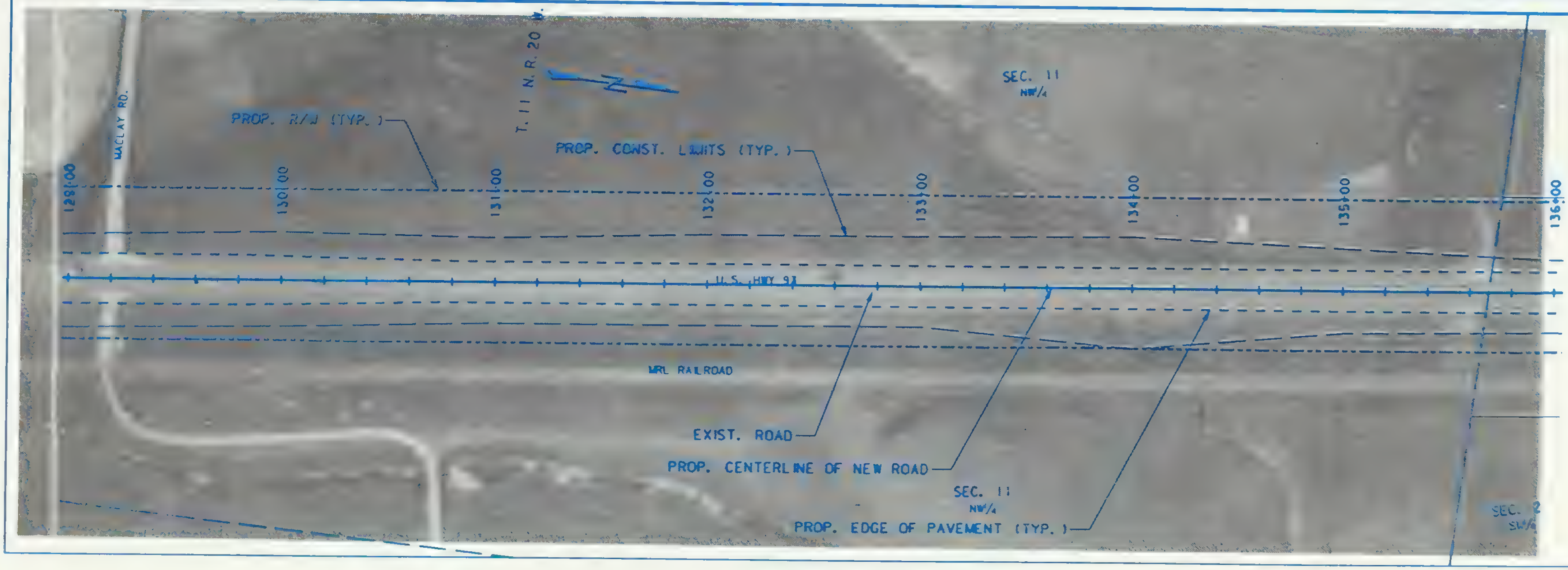




(4-Lane To 5-Lane)
(5-Lane To 4-Lane)

FLORENCE - LOLO

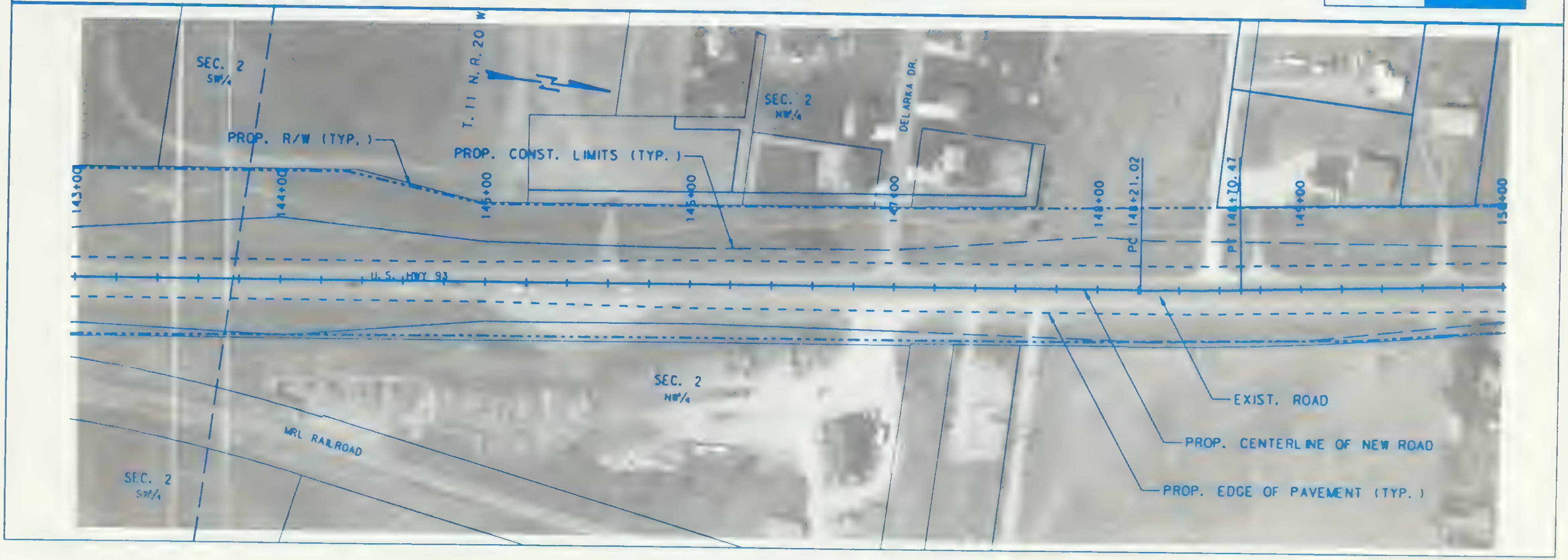
0 m 50 m 100 m

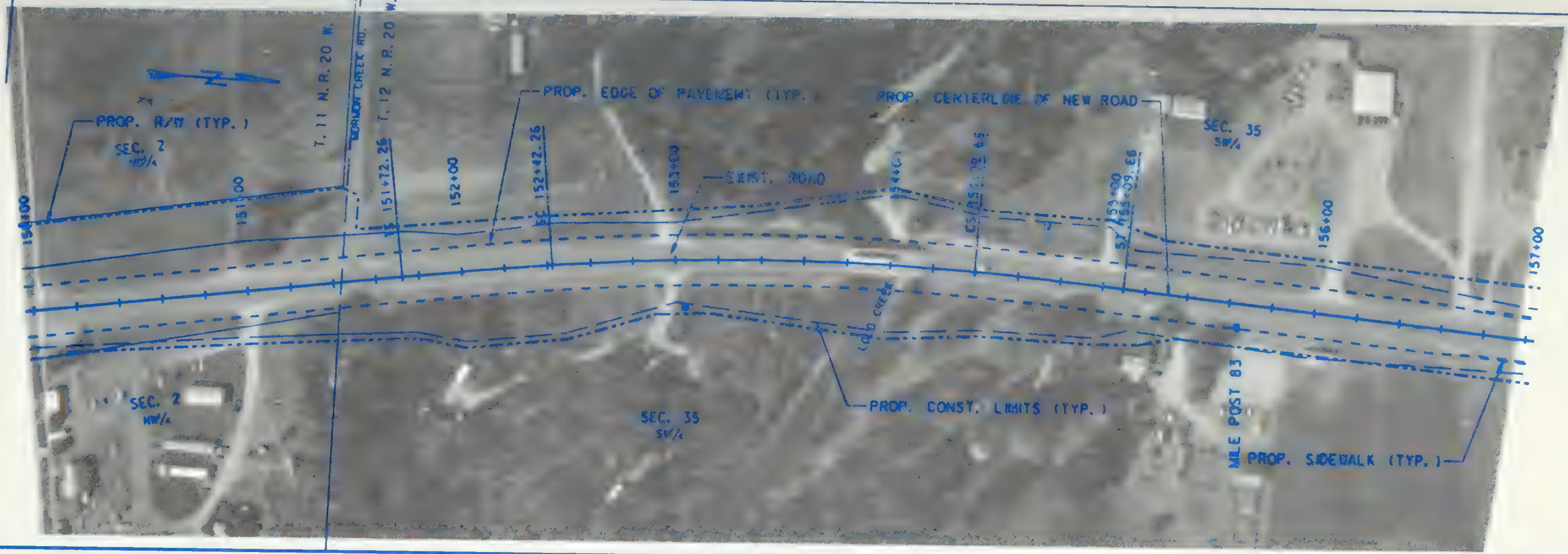


(4-Lane)
(4-Lane To 5-Lane)

FLORENCE - LOLO

0 m 50 m 100 m





(5-Lane To 5-Lane Urban)
(5-Lane Urban)

FLORENCE - LOLO

0 m 50 m 100 m

APPENDIX B

RELATED REPORTS AND STUDIES

2. *"US Highway 93 Summary Report of Telephone Survey"* - Dr. Joe W. Floyd, PhD; Billings, MT - January 29 to February 1, 1993

3. *"US Highway 93 Verbal and Written Surveys Final Report"* - Dr. Joe W. Floyd, PhD; Billings, MT - October 1992

4. Letter from Dale Paulson (FHwA) to Federal Register; September 17, 1992

5. Letter from Winston Dyer (Forsgren Associates, Inc.) to Interested Agencies and Property Owners; November 27, 1992

6. *"US 93 Hamilton to Lolo Transportation Improvements Study, Newsletter #1"* - Forsgren Associates, Inc.; West Yellowstone, MT - February 1994

7. *"US 93 Hamilton to Lolo Transportation Improvements Study, Newsletter #2"* - Forsgren Associates, Inc.; West Yellowstone, MT - April 1996

D. DESIGN CODES AND STANDARDS

1. A Policy on Geometric Design and Highways of Streets - American Association of State Highway and Transportation Officials (AASHTO); Washington D.C. - 1994 Edition

2. Montana Road Design Manual - Montana Department of Transportation; Helena, MT - April 1994

3. Highway Capacity Manual, Special Report 209, Third Edition - Transportation Research Board, National Research Council; Washington, DC - 1994

4. Multi-Lane Design Alternatives for Improving Suburban Highways, National Cooperative Research Program Report 282 - Transportation Research Board, National Research Council, March 1986

APPENDIX B
RELATED REPORTS, STUDIES, AND REFERENCES

A. REPORTS AND STUDIES COMPLETED FOR EIS

1. *"Hamilton - Lolo Transportation Corridor Analysis"* - Peter Schauer Associates; Boonville, MO - January 7, 1994

2. *"US Highway 93 Traffic Study"* - Keller & Associates; Boise, ID - December 1993

3. *"US Highway 93 Hamilton to Lolo Air Quality"* - Timothy Krause, Shapiro & Associates; Seattle, Washington - January 11, 1994

4. *"US Highway 93 Hamilton to Lolo Noise Report"* - Timothy Krause, Shapiro & Associates; Seattle, Washington - January 11, 1994

5. *"Evaluation of Silver Bridge Realignment Alternatives"* - Forsgren Associates; West Yellowstone, MT - June 1994

6. *"Economic Analysis"* - Forsgren Associates; West Yellowstone, MT - March 1994

7. *"Water Quality"* - Forsgren Associates, Inc; West Yellowstone, MT - March 1994

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9. *"Hazardous Material Assessment US Highway 93 Right-of-Way Corridor Hamilton to Lolo - Ravalli and Missoula Counties, Montana"* - Chen-Northern, Inc.; Helena, MT - November 1992

10. *"Biological Resources Report for Highway 93 Lolo to Hamilton* - OEA Research, Inc.; Helena, MT - June 7, 1994

11. *"US Highway 93 Wetlands Evaluation"* - OEA Research, Inc.; Helena, MT - June 1994

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14. *"Land Use Report"* - Forsgren Associates, Inc.; West Yellowstone, MT - March 1994

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17. *"Bicycle/Pedestrian Facilities"* - Forsgren Associates, Inc.; West Yellowstone, MT - March 1994

18. *"A Cultural Resource Inventory Report for the Proposed Lolo to Hamilton Transportation Improvement Project in Western Montana"* - Lynelle Peterson, Ethnoscience, Inc.; Billings, MT and Joan Brownell, Headwaters Cultural Resource; Bozeman, MT - November 1993

19. *"Energy and Commitment of Resources"* - Forsgren Associates, Inc.; West Yellowstone, MT - March 1994

20. *"The Significance of Deer Kill in Montana's Bitterroot Valley with Review of Preventative Measures"* - Robert Harris; Conner, MT - March 21, 1994

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B. CITED REPORTS AND STUDIES

1. *"Accident Study Evaluation"* - W.H. Butzlaff; Memo to Edrie Vinson - Montana Department of Transportation; Helena, MT - December 28, 1992

2. *"Ravalli Comprehensive Plan"* - Ravalli County, Montana; Hamilton, MT - Draft April 1994

3. *"Missoula County Comprehensive Plan"* - Missoula County Montana; Missoula, MT - June 1990

4. *"The Bitterroot Futures Study"* - The Bitterroot Valley Chamber of Commerce and the Bitterroot Resource Conservation and Development Area, Inc.; Hamilton, MT 1993

5. *"RC&D Business Incubator - Business Plan"* and *"Planning Manual"* - Bitterroot Valley Chamber of Commerce and Bitterroot Resource Conservation and Development Area, Inc. (RC&D); Hamilton, MT - March 1993

6. *"National Environmental Policy Act of 1969"*, as amended - US Congress; Washington D.C.

7. *"Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act"* - Council on Environmental Quality, Executive Office of the President; Washington D.C. - July 1, 1986

9. *"US Highway 93 Evaro to Polson - Draft Environmental Impact Statement and Section 4(f) Evaluation"* - US Department of Transportation Federal Highway Administration and State of Montana Department of Transportation - Morrison-Maierle, Inc.; Helena, MT - March 1995

10. Letter from US Fish & Wildlife Service to Montana Department of Transportation containing threatened and endangered species list for US 93 - Hamilton to Lolo - December 17, 1992

11. Montana Rail Link - Letter from Richard Keller, chief engineer to Kevin McCann; May 19, 1993

12. *"Montana 1994 Estimates of the Poulation"* - Montana Department of Commerce, Census and Economic Information Center - October 1995

C. PUBLIC INVOLVEMENT DOCUMENTS

1. *"US 93 Hamilton to Lolo Public Participation Plan"* - Forsgren Associates; West Yellowstone, MT - September 1992

APPENDIX C

SECTION 404(B)(1) EVALUATION (DRAFT)

APPENDIX C

U.S. 93 HAMILTON TO LOLO

ENVIRONMENTAL IMPACT STATEMENT

DRAFT

SECTION 404 (b)(1) EVALUATION

MAY 1995

Revised: December 1995

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DRAFT
SECTION 404(b)(1) EVALUATION

APPLICANT: Montana Department of Transportation
APPLICATION NUMBER: ____________________
PROJECT: Hamilton/Lolo (US Highway 93) Ravalli & Missoula Counties, Montana, NH 7-1(52)49

SECTION I. INTRODUCTION

The 404(b)(1) guidelines, found in Title 40 of the Code of Federal Regulations, Part 230, are the substantive criteria used in evaluating discharges of dredged or fill material in waters of the United States under Section 404 of the Clean Water Act and are applicable to all 404 permit decisions. Fundamental to these Guidelines is the precept that dredged or fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that such discharges would not have unacceptable adverse impacts either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern.

Subpart B of the guidelines establishes four conditions which must be satisfied to make a finding that a proposed discharge complies with the guidelines. Paragraph 230.10 provides that:

a) Except as provided under Section 404(b)(2), no discharge of dredged material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences;

b) No discharge of dredged or fill material shall be permitted if it violates state water quality standards, Section 307 of the Clean Water Act, or the Endangered Species Act of 1973;

c) No discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States; and

d) Except as provided under section 404(b)(2), no discharge shall be permitted unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Mitigation to offset significant and insignificant adverse impacts may be developed which could result in bringing a project into compliance with the guidelines. Impacts must be avoided to the maximum extent practicable and remaining unavoidable impacts will then be mitigated to the extent appropriate and practicable by requiring steps to minimize impacts and, finally, by compensation for loss of aquatic resource values.

Section 230.11 sets forth the factual determinations which are to be considered in determining whether a discharge satisfies the four conditions of compliance. These determinations are contained in the following evaluation.

SECTION II. PROJECT DESCRIPTION

A. LOCATION

US Highway 93 is a north-south highway in western Montana. The portion of the highway for this project is a 55.12 km (34.22 miles) portion from Hamilton to Lolo. Figure 1 in this report shows the project location. The project corridor is located on the Valley floor, which gently slopes from west to east toward the Bitterroot River. The terrain is generally flat, punctuated by occasional small ridges, and numerous small streams feeding down from the Bitterroot Range to the River.

B. GENERAL DESCRIPTION

An Environmental Impact Statement (EIS) has been prepared to examine various alternatives for improving transportation in the corridor and to identify the associated environmental impacts. The document is currently in draft form, but has not been presented to the public; comments are first being sought from regulatory and interested agencies.

The Draft EIS evaluates the following alternatives:

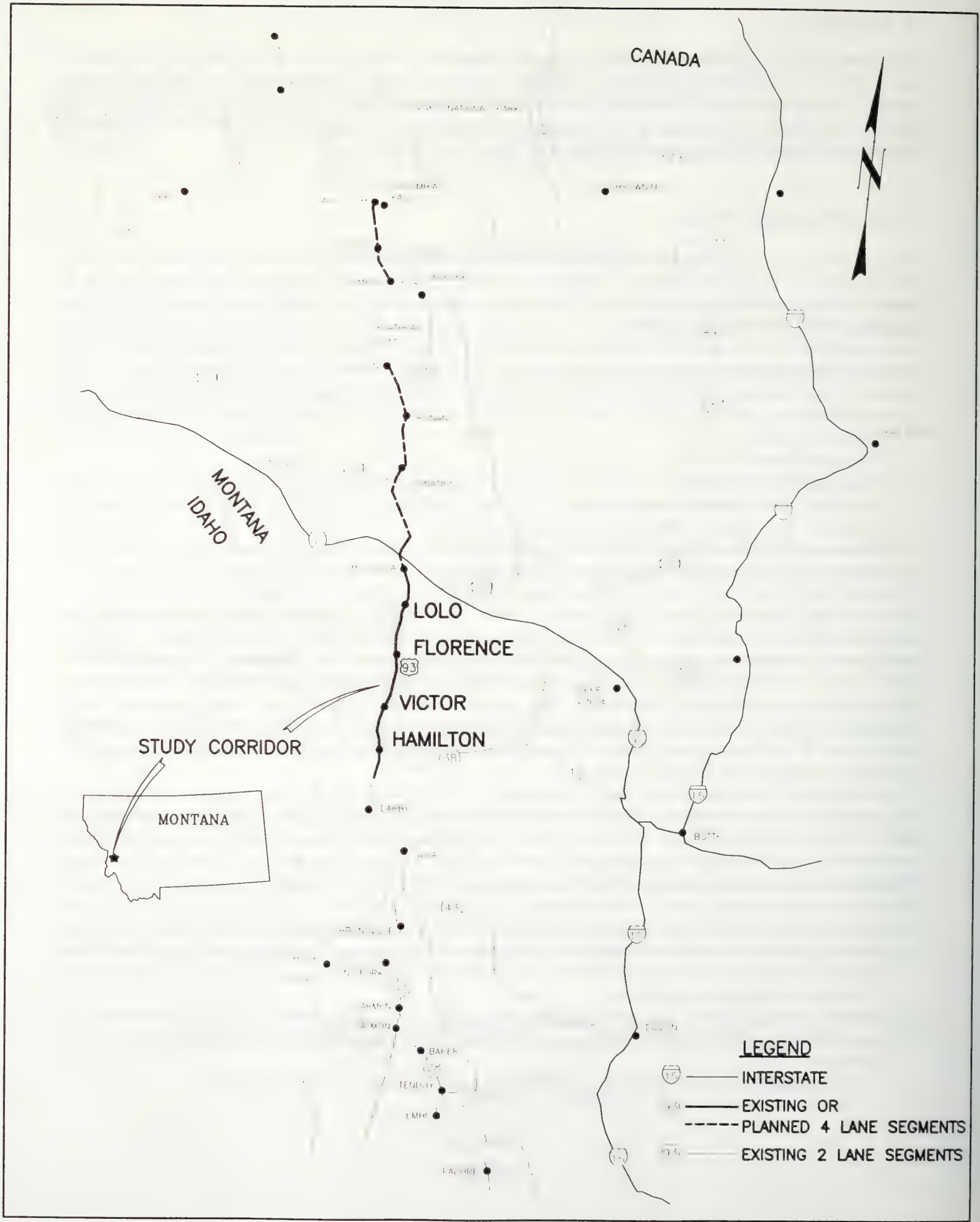
- No Action
- Park-and-Ride
- Commuter Bus Service
- Passenger Rail Service
- Alternate A - Modified 2-lane highway
- Alternate B - 4-lane undivided (no median) highway
- Alternate C - 4-lane divided with median and turnbays
- Alternate D - 5-lane highway with center turning lane

The proposed alignment for any "construction" alternatives would follow the existing US Highway 93 alignment with two exceptions, Silver Bridge realignment and Bass Creek Hill realignment. The first realignment provides for a new crossing of the Bitterroot River just north of Hamilton. The purpose of this realignment is to soften substandard horizontal curvature and provide the opportunity to construct new crossing facilities unimpeded, while still carrying the major traffic of the area on the old structure during construction. Realignment at the Bass Creek Hill area for a distance of approximately 3.2 km (2 miles) north seeks to pull the highway westerly away from the Bitterroot River and former meanders which constitute a considerable area of wetlands.

The preferred alternative recommended for implementation by the Draft EIS is in reality a combination of several alternatives set forth in the document. The elements were recommended for their ability to economically meet the stated purposes and needs for transportation improvement in the corridor, while offering the opportunity to minimize impacts. Elements of the preferred alternative include:

- construction of park-and-ride lots and implementation of a park-and-ride system
- establishment of a local transportation management association to administrate the park-and-ride system and further enhance opportunities to reduce traffic through implementation of transportation demand management techniques
- construction of 4-lane undivided highway principally in undeveloped (rural) areas of the corridor
- construction of 5-lane highway (4-lanes with center turning lane) principally in "urban" areas of the corridor
- minor realignment of the highway at Silver Bridge and the Bass Creek Hill areas

FIGURE 1
PROJECT LOCATION



- implementation of access control policies to enhance the function of the recommended construction alternatives
- construction of auxiliary lanes (turning and acceleration/deceleration)
- construction of pedestrian and bicycle facilities
- provision for curb, gutter, and drainage facilities where appropriate

Further detailed description of the preferred alternative and its elements can be found in Chapter 2.0 of the Draft EIS. Also, figures depicting the relocation alignments are shown in Chapter 2.0 of the Draft EIS.

Appendix A of the Draft EIS contains an overlay of the construction elements of the preferred alternative on an aerial photo background, along with a delineation of the construction limits and probable right-of-way boundaries.

C. AUTHORITY AND PURPOSE

The Highway Commission of the State of Montana has authorized environmental study and preliminary planning for improvements to this highway corridor in response to public demand and observed deficiencies of the existing system. These activities are being carried out under the auspices of the Montana Department of Transportation (MDT) with oversight and regulatory control from the Federal Highways Administration (FHwA), which agency is providing the majority of funding for this project through allocations to MDT.

Several deficiencies of the existing transportation system in this corridor have been identified. The following is a brief summary of the purposes and needs for improvement:

- US 93 is a highway of national significance, providing an important transportation link on a local, state, national, and international level.

- Improvements have already been completed or are in planning or design stages on other segments of US 93 resulting in incompatibility of this corridor when linking with the overall system.

- The highway in the study corridor does not have enough capacity to meet present demands and traffic is projected to increase at a rate of at least 3% annually for the next 20 years.

- The facility does not have adequate level of service presently and will not meet level of service (capacity vrs. volume) in the future.

- The heavy traffic congestion and lack of passing opportunities reduces safety, increases driver frustration, and produces a higher accident potential.

- There is strong public demand to improve transportation facilities within the corridor.

- The existing roadway is deficient in several areas in terms of geometry, shoulder width, sideslopes, sight distance, restricted width, sharp horizontal curvature, pavement rutting, potholing, and break-up. Correction of these deficiencies is needed to improve safety and performance of this transportation system.

Chapter 1.0 of the Draft EIS offers a more detailed description of the purposes and needs for proposed improvements.

D. GENERAL DESCRIPTION OF THE DREDGED OR FILL MATERIAL

1) **General Characteristics of Material**: Although no soil borings have been taken in the project corridor, the USDA Soil Conservation Service provided soil information from the Bitterroot Soil Survey and "as-built" soil information is available from previous highway construction projects in the corridor. Except for minor variations, the vast majority of the soil in the valley is some type of loam. The most frequently occurring type of loam is a coarse or gravelly, sandy loam. Underlying the loam deposits are significant sand and gravel layers formed by alluvial deposition from erosion of the nearby Bitterroot Mountains. The depth to groundwater in the valley is generally about five to six feet. Depth to bedrock is generally several hundred to several thousand feet in the Valley floor area but decrease to very shallow depths (some surface exposure) on the finger ridges that protrude transversely out from the mountain range across the study corridor to the Bitterroot River.

   The loam soils have moderate to high infiltration rates, even when thoroughly wetted, and are well drained. The sand and gravel layers are generally well graded and highly permeable. The abundance and ready availability of this alluvial gravel material makes it the prime material of choice for use as borrow and fill material for embankments where construction alternatives are recommended for implementation.

   A geotechnical reconnaissance was performed which indicates the corridor soils are predominately reworked glacial and alluvial deposition with deep deposits of sand and gravels along with occasional pockets of fine-grained silt-clay soil deposits. Slopes of the project vary from level to moderate with level conditions being the most common.

2) **Quantity of Material**: The majority of the wetland encroachments or fills in wetland areas will be the result of the highway crossing riparian areas. Most are encroachments transversed to the direction of stream flow. Therefore, most would involve approach fills, construction of abutments and piers for bridges, or placement of fills over culverts and other required grading necessary for the crossings. Elsewhere encroachment into wetland areas would result from widening the highway to accommodate additional lanes and wider shoulders if "build" alternatives are selected.

   Wetland discharge sites which occur within riparian areas are associated with surface water sources, such as streams and creeks. Other discharge sites are wetlands which occur in the non-riparian areas and are supported by groundwater or irrigation sources. Table 1 summarizes the locations of the major stream crossings throughout the study area.

   Table 2 gives the estimated fill volumes at major crossings which involve fill in riparian wetlands.

3) **Source of Material**: According to a geotechnical reconnaissance study conducted for the EIS, excellent construction materials are located throughout the corridor which should provide a ready source for fill, surfacing, and borrow materials. Sources have generally been available during the past construction projects in this area. Due to the availability of excellent construction materials, all borrow will likely be specified with a high classification such as A-1-B(0) or better to take advantage of these available soils.

   Fill material used for widening and construction of approaches to bridges and fills over culverts will likely be embankment material generated on-site or nearby through excavation of cut areas along the roadway.

   No specific borrow source locations have been identified to date. Borrow will not be taken from areas without the proper environmental and archaeological clearances. Borrow sources will likely be chosen which are within the area and therefore will be similar to the on-site soils.

TABLE 1 MAJOR STREAM CROSSING LOCATIONS					
Approx Station	**Approx Milepost**	**Stream Crossing**	**Fishery ***	**Existing Structure**	**Potential Structure**
Hamilton- Victor					
17+80	49.5	Bitterroot River (Silver Bridge)	B,C,D,E	Bridge	Bridge
23+00	49.8	Woodside Canal	no data	Bridge	Culvert
28+95	50.3	Blodgett Creek	B (r-spawn)	Bridge	Bridge
36+60	50.8	Blodgett Creek	A(bt)**, B(r-spawn)	Bridge	Bridge
97+05	54.5	Mill Creek	no data	Bridge	Bridge
137+30	56.7	S Bear Creek	A(bt)**, B(r-spawn), C**	Bridge	Bridge
149+40	57.4	N Bear Creek	B (r-spawn, r,b,bn)	Culvert	Bridge
158+00	57.9	N Bear Creek	B (r-spawn, r,b,bn)	Culvert	Bridge
Victor - Florence					
21+20	59.8	Sweathouse Creek	A(bt)**	Bridge	Bridge
51+40	61.6	Big Creek	B(r,bn-spawn,r,b,bn)**	Bridge	Bridge
101+00	64.6	McCalla Creek	no data	Culvert	Culvert
106+80	65.0	McCalla Creek	no data	Bridge	Bridge
123+25	66.0	McCalla Creek	no data	Bridge	Bridge
125+20	66.2	Kootenai Creek	B(r,bn-spawn)	Bridge	Bridge
194+70	70.5	S Bass Creek	no data	Culvert	Culvert
203+90	71.2	N Bass Creek	A(c)**	Culvert	Culvert
207+80	71.4	Larry Creek	A(c)**	Culvert	Culvert
208+60	71.5	½ Larry Creek	no data	Culvert	Culvert
209+80	71.5	½ Larry Creek	no data	Culvert	Culvert
234+80	73.0	Sweeney Creek	A(c,bt)**, B(r)	Culvert	Bridge
Florence - Lolo					
10+70	74.2	One-Horse Creek	no data	Culvert	Culvert
36+10	75.8	Tie Chute Creek	no data	Culvert	Culvert
70+90	77.8	Carlton Creek	no data	Culvert	Culvert
89+10	79.0	Maple Creek	no data	Culvert	Culvert
154+00	82.9	Lolo Creek	A(c,bt)**	Bridge	Bridge

* Fisheries: A=species of concern (c=cutthroat, bt=bulltrout); B=trout(r=rainbow, b=brook, bn=brown); C=other salmonids; D=non-salmonid game fish; E=non-game rough

** Information available for areas upstream for Bitterroot or Lolo National Forest

Note: Culverts could change to bridges if interdisciplinary team so directs.

TABLE 2
ESTIMATED FILL VOLUMES AT MAJOR CROSSINGS FOR BUILD ALTERNATIVES

Approx Mile-post	Stream Crossing	2-lane Modified		4-lane Undivided		4-lane Divided		5-lane		Preferred Alternative		Potential Struc-ture
		CY	CM	CY	CM	CY	CM	CY	CM	CY	CM	
49.5	Bitterroot River (Silver Bridge)	9	7	13	10	16	12	19	14	13	10	Bridge
49.8	Woodside Canal	133	102	200	153	244	187	278	213	200	153	Culvert
50.3	Blodgett Creek	9	7	13	10	16	12	19	14	19	14	Bridge
50.8	Blodgett Creek	7	5	11	8	13	10	15	11	15	11	Bridge
54.5	Mill Creek	5	4	8	6	10	7	11	9	11	9	Bridge
56.7	S Bear Creek	18	14	27	20	33	25	37	28	27	20	Bridge
57.4	N Bear Creek	7	5	11	8	13	10	15	11	11	8	Bridge
57.9	N Bear Creek	7	5	11	8	13	10	15	11	15	11	Bridge
59.8	Sweathouse Creek	13	10	20	15	24	19	28	21	20	15	Bridge
61.6	Big Creek	7	5	11	8	13	10	15	11	15	11	Bridge
64.6	McCalla Creek	107	82	160	123	196	150	222	170	160	123	Culvert
65.0	McCalla Creek	5	4	8	6	10	7	11	9	8	6	Bridge
66.0	McCalla Creek	6	5	9	7	11	9	13	10	13	10	Bridge
66.2	Kootenai Creek	7	5	11	8	13	10	15	11	15	11	Bridge
70.5	S Bass Creek	240	184	360	276	440	337	500	383	500	383	Culvert
71.2	N Bass Creek	227	174	340	260	416	318	472	362	340	260	Culvert
71.4	Larry Creek	100	77	150	115	183	140	208	160	150	115	Culvert
71.5	½ Larry Creek	80	61	120	92	147	112	167	128	120	92	Culvert
71.5	½ Larry Creek	90	69	135	103	165	126	188	144	135	103	Culvert
73.0	Sweeney Creek	6	5	9	7	11	9	13	10	13	10	Bridge
74.2	One-Horse Creek	200	153	300	230	367	281	417	319	417	319	Culvert
75.8	Tie Chute Creek	400	306	600	460	733	562	833	638	600	460	Culvert
77.8	Carlton Creek	140	107	210	161	257	197	292	223	292	223	Culvert
79.0	Maple Creek	70	54	105	80	128	98	146	112	105	80	Culvert
82.9	Lolo Creek	12	9	17	13	21	16	24	18	24	18	Bridge
	TOTALS	1,905	1,459	2,859	2,187	3,494	2,674	3,970	3,040	3,238	2,475	

Notes: 1) Fill volumes in the table are the amount of additional fill which would be required at each crossing if the corresponding alternative was selected.
2) For each crossing where a bridge will potentially be used, it was assumed that the entire creek would be spanned with no constriction of flow.
3) These values are just estimates and may change significantly during final design.

E. DESCRIPTION OF THE PROPOSED DISCHARGE SITES

A Wetlands Evaluation Report was prepared for this study area by an ecological consulting firm (OEA Research, Inc., 1994). This report is on file with MDT. It documents the methodology used in delineating the wetlands; tabulates location, size, and type of wetlands identified within the project corridor; and proposes mitigation alternatives for potential impacts. Table 3 is a summary of the wetland occurrence and disturbed acreage for each construction alternative, including the preferred alternative.

1) **Location of Sites**: All of the wetlands and surface waters impacted by the construction alternatives are part of the Bitterroot River drainage. The locations of wetland sites are described and identified in the Wetland Evaluation Report which was prepared for the study corridor and they are listed in Table 3.

2) **Size of Sites**: The wetlands were delineated using the US Army Corps of Engineers' Environmental Laboratory Method (1987). A study corridor width of 158 m (520 ft) (half on either side of centerline) was inventoried. Because of the extent of wetlands in and adjacent to the highway right-of-way, the entire corridor was walked. Boundaries of the wetland areas were surveyed with Global Positioning system equipment to accurately determine the area.

   The total delineated amount of jurisdictional wetland acreage occurring within the study corridor is 170.1 hectares (260.5 acres). Table 3 shows the total acreage of wetlands within the corridor at each specific location and also the acreage which would be disturbed by each construction alternative.

3) **Type of Sites**: The highway crosses numerous perennial and intermittent creeks, many of which are dominated by riparian communities. Wetlands typically comprise 50% to 90% of these areas.

   The corridor hosts a variety of wetland resources. Table 3 shows the type of wetlands occurring at each site. Numerous right-of-way ditch wetlands occur due to a high groundwater table and surface water flow meanders caused by the highway berm. Most of these types have standing water in the spring and possibly early summer depending on the amount of runoff from the nearby mountains. Many of the areas along the railroad paralleling the highway have standing water for more than six months in the deeper borrow areas.

4) **Types of Wetlands Habitat**: Table 3 gives the type of wetland at each delineated site including the hydrologic category, vegetation dominance type, and the hydrologic source.

5) **Timing and Duration of Discharge**: The timing and duration of construction activities will depend on the alternative chosen for that specific location and the type of construction (bridge, road widening or new road construction). Detailed schedules and phasing plans would be prepared during final design. The timing and duration will be determined to minimize turbidity and other disturbances in the wetlands and streams. Construction schedules will be specified to not conflict with spawning and migration periods.

   The construction periods and duration are described in Section 4.24 -*Implementation* of the Draft EIS.

TABLE 3
SUMMARY OF WETLAND OCCURRENCE AND DISTURBANCE ACREAGE

SITE #	MILEPOST		WETLAND TYPES		Function & Value Rating***	520 FT STUDY CORRIDOR		ALTERNATIVES									
								2-Lane Modified		4-Lane Undivided		4-Lane Divided		5-Lane		Preferred Alternative	
			Hydrologic Category & Veg. Dominance Type*	Hydrologic Source**		hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres
HAMILTON - VICTOR																	
1	49.00	---	2AB	I	low	0.05	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	49.25	49.50	2ABC, 3ABD	R/G	mod	0.95	2.34	0.79	1.94	0.84	2.07	0.95	2.34	0.89	2.19	0.84	2.07
3	49.70	---	2A	G(I)	low	0.35	0.87	0.27	0.68	0.29	0.72	0.35	0.87	0.31	0.77	0.31	0.77
A1	49.80	---	2A	P	low	0.02	0.06	0.02	0.04	0.02	0.04	0.03	0.06	0.02	0.05	0.02	0.04
4	49.90	---	2A, 3AB	G	low	0.14	0.34	0.06	0.15	0.06	0.15	0.07	0.18	0.06	0.16	0.06	0.15
A2	49.90	49.95	2A	P	low	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02
5	49.90	50.10	2AB	G(I)	low	1.44	3.56	0.04	0.10	0.08	0.19	0.04	0.10	0.10	0.24	0.08	0.19
6	50.05	50.25	3ABC, 2ABC	R/I/G	mod	1.52	3.76	0.39	0.96	0.39	0.97	0.70	1.72	0.44	1.09	0.42	1.03
A3	50.15	---	2A	P	low	0.01	0.03	0.00	0.01	0.01	0.03	0.01	0.03	0.01	0.03	0.01	0.03
7	50.30	50.50	3ABC(D), O	R	mod #	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A4	50.35	---	2A	P	low	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
A5	50.60	50.65	2A	P	low	0.03	0.07	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01
8	50.60	50.80	3ABC, 1 DO	R	mod	1.44	3.55	0.25	0.62	0.27	0.66	0.50	1.23	0.31	0.77	0.31	0.77
A6	50.85	50.95	2AB	P	low	0.04	0.09	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
9	51.15	51.45	O, 1D, 2ABC	G/P(I)	mod #	2.02	5.00	0.79	1.94	0.88	2.18	1.34	3.32	1.00	2.47	1.00	2.47
10	51.45	51.85	2AB, 1D	I/G	low	2.17	5.35	0.52	1.28	0.69	1.71	0.73	1.79	0.75	1.84	0.75	1.84
11	54.40	54.65	2ABC, 3ABC,-1DO	R/G	mod	3.08	7.60	0.27	0.68	0.43	1.05	0.79	1.96	0.56	1.38	0.46	1.13
12	54.80	---	1 D	I/P	low	0.05	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A7	54.95	---	2A/B	I/P	low	0.14	0.34	0.02	0.05	0.02	0.05	0.03	0.08	0.03	0.07	0.02	0.05
15	54.95	55.30	2AB, 1D, O	G	mod #	2.20	5.43	0.06	0.16	0.09	0.23	0.10	0.25	0.11	0.27	0.09	0.23
13	55.15	---	2AB, 1D	I	low	0.09	0.23	0.02	0.06	0.02	0.06	0.06	0.14	0.03	0.08	0.02	0.06
14	55.20	55.40	2AB(C), 1DO	G/P(I)	low	0.92	2.27	0.29	0.71	0.29	0.73	0.47	1.17	0.36	0.89	0.29	0.73
16	55.45	55.50	3ABC, 2BC, O	R/G	mod	0.85	2.09	0.24	0.60	0.28	0.68	0.39	0.96	0.33	0.81	0.28	0.68
17	55.70	55.75	1D, 2AB	I(P)	low	0.45	1.11	0.06	0.14	0.07	0.17	0.09	0.21	0.07	0.18	0.07	0.17
19	55.75	56.30	2AB, 1D	G	mod #	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	56.20	---	2AB, 1D	I	low	0.21	0.52	0.08	0.19	0.09	0.21	0.11	0.28	0.10	0.25	0.10	0.25
20	56.40	56.50	2A	P/I	low	0.21	0.52	0.10	0.25	0.12	0.29	0.18	0.44	0.14	0.34	0.14	0.34
21	56.65	56.75	2ABC	G	low	1.54	3.82	0.18	0.43	0.20	0.50	0.33	0.81	0.27	0.66	0.21	0.52
22	56.90	---	1D, 2A	I(P)	low	0.05	0.12	0.04	0.10	0.05	0.12	0.06	0.15	0.05	0.13	0.05	0.12
23	57.00	57.05	3ABC, 2AB(C)	R	mod	0.49	1.22	0.22	0.55	0.23	0.58	0.40	0.99	0.27	0.66	0.23	0.58
24	57.40	57.45	2A	P/I	low	0.14	0.35	0.11	0.26	0.12	0.30	0.14	0.35	0.13	0.31	0.12	0.30
25	58.85	59.00	2AB, 1D	P/I	low	1.66	4.11	0.38	0.93	0.41	1.00	0.75	1.84	0.50	1.23	0.50	1.23
SUBTOTALS HAMILTON - VICTOR						22.27	55.03	5.21	12.87	5.96	14.73	8.63	21.32	6.86	16.92	6.40	15.80

TABLE 3
SUMMARY OF WETLAND OCCURRENCE AND DISTURBANCE ACREAGE

SITE #	MILEPOST		WETLAND TYPES		Function & Value Rating***	520 FT STUDY CORRIDOR		ALTERNATIVES									
								2-Lane Modified		4-Lane Undivided		4-Lane Divided		5-Lane		Preferred Alternative	
			Hydrologic Category & Veg. Dominance Type*	Hydrologic Source**		hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres
VICTOR - FLORENCE																	
26	59.50	—	2A(B), 1D	G/P	low	0.80	1.98	0.19	0.46	0.23	0.56	0.28	0.68	0.23	0.57	0.23	0.57
27	59.65	59.80	3AB, 2AB	R/G	mod	1.00	2.46	0.28	0.69	0.31	0.77	0.38	0.95	0.33	0.82	0.31	0.77
28	60.05	60.30	O, 1D, 2AB	G	low	1.71	4.23	0.19	0.47	0.19	0.47	0.74	1.84	0.27	0.66	0.19	0.47
29	60.60	60.70	2AB, 3AB	I	low	0.76	1.88	0.40	0.98	0.41	1.00	0.58	1.42	0.47	1.15	0.41	1.00
A8	61.35	61.50	2A	P	low	0.13	0.32	0.13	0.33	0.13	0.33	0.13	0.33	0.13	0.33	0.13	0.33
30	61.50	61.70	2AB, 3ABC, 2A	R	mod	1.44	3.56	0.51	1.26	0.56	1.38	0.75	1.86	0.62	1.53	0.57	1.41
31	61.85	61.90	2AB	G/I	low	0.76	1.88	0.27	0.67	0.29	0.73	0.35	0.86	0.32	0.79	0.29	0.73
32	62.20	62.30	2AB	G/I	low	1.12	2.77	0.24	0.60	0.28	0.70	0.43	1.05	0.33	0.82	0.28	0.70
A9	62.75	—	2A	P	low	0.05	0.11	0.03	0.07	0.03	0.07	0.05	0.11	0.03	0.08	0.03	0.07
33	62.85	62.95	2A, 2BC, O	G	low	0.88	2.17	0.19	0.47	0.19	0.47	0.47	1.16	0.23	0.57	0.19	0.47
34	63.20	63.55	2AB(C), 1D	G	mod	3.28	8.10	0.97	2.41	1.06	2.63	1.31	3.22	1.20	2.97	1.10	2.72
35	63.65	63.90	O, 1D, 2ABC	G	mod #	1.67	4.13	0.07	0.17	0.16	0.39	0.19	0.48	0.22	0.54	0.16	0.39
A10	63.80	63.90	2A	P	low	0.09	0.23	0.09	0.22	0.09	0.22	0.09	0.23	0.09	0.23	0.09	0.22
A11	64.20	—	2AB, 1D	P	low	0.06	0.15	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.00	0.01
36	64.20	64.30	O, 2AB, 1D	G	mod	1.03	2.55	0.37	0.92	0.48	1.18	0.55	1.35	0.54	1.32	0.51	1.25
A12	64.55	—	2A	P	low	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14
37	64.60	64.70	1DO, 2ABC, 3ABC	R/G	mod #	0.22	0.53	0.11	0.27	0.14	0.34	0.22	0.53	0.17	0.42	0.14	0.34
A13	64.75	65.05	combine w/site 38														
38	64.70	65.05	2AB, 3AB, 1OBD	G/R/P	mod #	1.70	4.20	0.74	1.86	0.87	2.17	1.07	2.63	0.99	2.44	0.87	2.17
39	65.15	—	2ABC	I/G	mod	0.17	0.43	0.03	0.06	0.04	0.10	0.04	0.10	0.04	0.11	0.04	0.11
A14	65.30	65.40	2A	P	low	0.03	0.07	0.02	0.04	0.02	0.04	0.03	0.07	0.02	0.05	0.02	0.05
40	65.40	65.50	3BC (est.)	R/G	unknown	0.40	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	65.55	65.70	2AB(C)	G	mod #	0.79	1.96	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
42	65.80	—	3AB	G/I	low #	0.14	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
A15	65.70	65.95	2AB	P	low	0.06	0.16	0.05	0.12	0.05	0.12	0.06	0.14	0.05	0.13	0.05	0.13
43	65.95	66.30	O, 1BCD, 2AB, 3AB	R/P		3.85	9.52	0.86	2.12	1.00	2.48	1.35	3.33	1.14	2.82	1.14	2.82
A16	67.50	67.60	2AB	P	low	0.15	0.38	0.06	0.15	0.06	0.15	0.08	0.19	0.06	0.15	0.06	0.15
A17	67.75	68.00	2AB	P	low	0.71	1.74	0.14	0.34	0.16	0.41	0.27	0.67	0.17	0.43	0.17	0.42
44	68.05	68.20	2A	G	low	0.79	1.96	0.27	0.67	0.27	0.67	0.50	1.24	0.31	0.76	0.28	0.69
A18	68.35	69.00	2A	P/I	low	1.21	2.99	0.28	0.70	0.30	0.75	0.29	0.73	0.28	0.70	0.30	0.75
45	69.00	69.20	2A(B)	P	low	0.52	1.28	0.48	1.20	0.49	1.20	0.50	1.23	0.49	1.21	0.49	1.20
46	69.15	69.55	2AB, O, 1D	P/G	mod #	0.66	1.63	0.63	1.55	0.63	1.55	0.66	1.63	0.63	1.57	0.63	1.55

TABLE 3
SUMMARY OF WETLAND OCCURRENCE AND DISTURBANCE ACREAGE

SITE #	MILEPOST		WETLAND TYPES		Function & Value Rating***	520 FT STUDY CORRIDOR		ALTERNATIVES											
								2-Lane Modified		4-Lane Undivided		4-Lane Divided		5-Lane		Preferred Alternative			
			Hydrologic Category & Veg. Dominance Type*	Hydrologic Source**		hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres	hectares	acres		
A31	81.55	81.90	combine w/site 69																
71	81.85	82.00	2A, 1ADO	G/P	mod	4.09	10.09	0.30	0.75	0.30	0.75	0.71	1.75	0.38	0.93	0.30	0.75		
A32	81.50	82.00	combine w/site 71																
72	82.80	82.90	3BC, 2A	R/G	mod	1.37	3.38	0.07	0.17	0.07	0.17	0.16	0.39	0.07	0.18	0.07	0.18		
SUBTOTALS FLORENCE - LOLO						93.96	232.17	2.20	5.40	2.23	5.51	5.37	13.27	2.84	7.00	2.28	5.63		
GRAND TOTAL						107.11	260.47	16.50	40.76	18.13	44.85	27.76	68.54	20.73	51.24	18.95	46.88		

* Wetland Types follow the Montana Interagency Wetlands Group (1988) as modified from Novitsky 1979.

1 Hydrologic Category = sites with permanent shallow (<6.6 ft) water [>9 mos/yr]
Vegetative Dominance Type
- A - Floating
- B - Rooted Submerged
- C - Rooted Floating-Leaved
- D - Rooted Emergent

2 Hydrologic Category = sites with seasonal or permanent water tables, but without permanent standing water
- A - Herbaceous
- B - Shrub
- C - Forested
- D - Unvegetated

3 Hydrologic Category = riparian sites adjacent to streams or rivers with seasonally saturated soil conditions
- A - Herbaceous
- B - Shrub
- C - Forested
- D - Unvegetated

** Hydrologic Source: I=irrigation supported; R=riparian; P=ponded generally due to highway or railroad berms; g=groundwater supported

*** Function and Value Rating

SECTION III. FACTUAL DETERMINATIONS (Section 230.11)

Determinations include both the individual and cumulative effects of the discharges for both the short and long-term where applicable.

A. PHYSICAL SUBSTRATE DETERMINATIONS

1) **Substrate Elevation and Slope**: The elevation and slope of the streambeds which will be impacted by US Highway 93 improvement alternatives would not be adversely affected by any of the potential construction alternatives. In nearly all cases the existing channel characteristics will be preserved. The placement of fill materials along the banks of the streams paralleling the highway may require some minor localized changes to the elevation, and slope of the stream channel. Overall stream flow gradients and regimes in these limited areas would not change or create velocity changes sufficient to cause or abnormal deposition or scour problems.

2) **Compare Fill Material and Substrate at Discharge Site**: At the stream crossings, the substrate is expected to be smooth cobbles with clean gravels and fine sediments along the embankments and in the streambed. The fill used would be select granular backfill having very similar characteristics.

   Substrates in wetland areas would be fine sediments supplied by feeder streams and precipitation runoff. The fill material placed in the wetlands or stream crossings would either be granular material from nearby sources or excess material from the project itself. Therefore, the two materials would be expected to have similar constituents and be compatible to the native soils.

3) **Dredged/Fill Material**: The fill materials used in the stream crossings would be granular materials which are not susceptible to movement by water action. Since the water velocity in the wetland areas is relatively negligible, material movement will not be a problem.

4) **Physical Effects on Benthos Invertebrates/Vertebrates**:

   a) **Physical Effects on Benthos**: Benthic organisms would only be impacted along the streambanks or in the wetland areas where fill materials would be placed. In the long term, the benthic organisms would relocate and re-establish themselves in the fill material. Therefore, the only physical effects on benthos should be short-term localized impacts.

   b) **Invertebrates**: Similar to the physical effects on benthos, the impacts to aquatic invertebrates will also primarily be short term. Fill material placed along the river bank or in wetlands would bury existing organisms, but new organisms would be expected to quickly re-establish themselves in these areas. Additionally, construction activities could cause localized increases in suspended sediment, which would adversely effect aquatic insects that rely upon sight to find food. Increased sediment levels also clog interstitial spaces in the river-bed which invertebrates use for habitat, but such will quickly regenerate when turbidity is abated and "flushing" occurs.

   c) **Vertebrates**: Sediment from the erosion of disturbed areas is the primary source of adverse impacts to aquatic vertebrates. For the study area, "aquatic vertebrates" applies primarily to fish. Sediment in streams affects fish by increasing silt in spawning gravel and rearing habitat. This suffocates the eggs or fry and affects the aquatic organisms that fish rely on for food. Sediment is also abrasive to fish gills. The use of best management practices for erosion control should alleviate these adverse impacts or reduce them to short-term and tolerable levels.

F. DESCRIPTION OF DISPOSAL METHOD

The type of disposal methods will depend on the type of construction that is undertaken in a specific location. The following sections describe the general construction methods which would be used for "build" alternatives selected to widen the existing highway, build a new highway, or construct a bridge or culvert in the vicinity of surface waters and wetlands.

- **Roadway Widening**: When widening the highway, it would be necessary to place fill in wetlands which are encountered along the highway. The fill material would be placed in the wetlands by large earth-moving and excavation equipment. The material would likely be from nearby source pits or excess material from other areas within the project corridor. The fill would be necessary to construct the proper side slopes and adjust the elevation of the roadway.

- **New Roadway Construction**: The construction method for new roadway construction would be similar to the methods used when widening the highway. Where necessary, the area where fill is to be placed would first be cleared of trees and shrubs then fill material would be placed and compacted in relatively thin lifts. Disturbance of the area would be more pronounced due to the larger areas of wetlands which would be filled and the need to clear vegetation where new fill is to be placed.

- **Bridge and Culvert Construction**: Bridge construction would require that the streambed be excavated to construct the footings, piers and abutments for the structure. Culvert construction would also require excavation in the streambed to lay the pipe or box culvert.

  To minimize the impacts, the Contractor would isolate the construction activities from the stream channel. This can be accomplished by using cofferdams. Cofferdams are temporary structures which are constructed in the streambed and enclose the construction activities. After they are in place, the river water trapped within the dam is pumped out to expose the river-bed and facilitate the excavation and construction activities. The excavated materials and pumped water from within the cofferdams would be transferred to a temporary settling pond to remove the sediment. The sediment would be disposed of in proper locations and the water would be returned to the stream. The locations of the settling ponds would be identified before the construction permits were obtained.

  Cofferdams can be constructed by wrapping sheet pile or heavy plastic around steel piles which are driven into the streambed. For piers and abutments, a concrete base is usually poured to seal the cofferdam. Temporary ladders and scaffolding would be required for equipment and workers to use during construction.

Whenever possible, recommended construction should be timed so that it does not coincide with spawning runs when migration movements could be disrupted or blocked.

Toxic materials can also cause problems for fish. Toxins can be introduced to the streams by runoff or through accidental spills or contact with hazardous materials. Again, best management practices during construction should minimize the potential of these problems.

The potential effects of the proposed action on fish and other vertebrates found in the study corridor are described in Section 4.11 of the Draft EIS.

5) **Erosion and Accretion Patterns**: Except for the Silver Bridge realignment, none of the potential alternatives would alter erosion or accretion processes that are currently naturally associated with the streams in the project area. At the Silver Bridge realignment site (milepost 49.5), the existing flow pattern of the Bitterroot River has caused undesirable erosion and accretion patterns. When the bridge was originally constructed, the floodplain was narrowed by approach fills and directed westward in order to narrow the crossing.

This condition has caused scour and erosion at the bridge location. This eroded material has been deposited downstream from the bridge and altered the original course of the river by blocking the main easterly channel and forcing the water through a smaller westerly channel that runs past the mouth of Blodgett Creek and then passes Blodgett Park where subsequent erosion is occurring.

By realigning the highway, the narrow crossing could be removed and the river could be returned to its original course; therefore the impact of the proposed alternatives would be beneficial.

6) **Actions Taken to Minimize Impacts**: Measures can be incorporated into the proposed action to minimize the impacts to the streams and wetlands:

   a) Select the "no action" or "no build" alternatives if practicable.

   b) Design to avoid wetland or stream areas if at all possible by shifting alignment or altering grade.

   c) Place the fill in the smallest area possible.

   d) Use fill materials that are similar to the substrate whenever possible.

   e) Schedule the timing and duration of the construction activities to coincide with the lowest flows possible.

   f) Use the Montana Department of Transportation Highway Construction Standard Erosion Control Work plan to identify best management practices for erosion control that are specific to any proposed actions. The goal of the plan will be to prevent erosion of disturbed areas and minimize the discharge of pollutants and sediments into surface waters. The Contractor for improvements will be required to follow the recommended BMP's. The selection of the BMP's would be done during the final design activities and at the discretion of the highway designer.

B. WATER CIRCULATION, FLUCTUATION AND SALINITY DETERMINATIONS

1) **Water**: The Draft EIS contains a discussion of surface waters and their associated quality. The following sections discuss the proposed action's impact on various components of the water quality.

a) **Salinity**: No site specific tests for salinity have been performed. However, observations of streams and wetlands in the project corridor showed no saline areas. Although velocities are slow, water in wetland areas is continually resupplied and drained away. There are no known impoundment areas where water could be reasonably expected to increase in salinity. Such changes would most likely result from altering the hydraulic regime and interconnection of wetlands and streams or the use of fill materials significantly different from native soils -- neither of which are expected to occur as a result of the proposed action.

b) **Water Chemistry**: Although no site specific tests have been performed, there is no reason to suspect that the proposed action would significantly alter the alkalinity, hardness, pH level, or mineral concentration in the surface waters. Information obtained on ambient water quality shows water chemistry to be within acceptable limits.

c) **Suspended Sediments**: Construction improvements would cause temporary, localized, minor increases in suspended sediments during construction activities especially near streams where fines in the new fill material are transported from the disposal sites by water currents. Stable, granular fill materials would be used to minimize these impacts.

d) **Clarity**: During the placement of fill materials along stream embankments, there may be temporary, localized increases in turbidity. These increases in turbidity would be very minor compared to the increases which naturally occur during spring run-off conditions or after heavy rainstorms.

e) **Color**: The placement of fill materials in wetlands and streams could disrupt the substrate and increase the suspended sediments and turbidity in the water. This would have the effect of temporarily and locally altering the color of the waters in the vicinity of the construction activity, especially immediately following the fill placement. This change in color would be similar to the change in color during the spring runoff when high concentration of sediments from the surrounding drainages give the river a milky color.

   This short-term impact would be minimal.

f) **Odor**: The project would not significantly cause any unnatural odors in the streams and wetlands.

g) **Taste**: The project would not significantly alter the taste of the surface water or the groundwater in the project area precluding any unforeseen spills or highly abnormal conditions.

h) **Dissolved Gas Levels**: Because improvements are not expected to significantly increase the turbulence of flows, stagnation in the streams and wetlands, or cause other changes to hydraulic regimes, it is unlikely that the existing dissolved gas levels will be altered in any way.

i) **Nutrients**: Nutrient loads such as phosphorus and nitrogen predominantly come from non-point agricultural sources along the river or stream course, point discharges such as wastewater treatment plants, and other naturally occurring high organic loads such as decaying algae. None of these conditions are expected to be impacted by the proposed action and since the hydraulics of wetlands and surface waters through the project area will be maintained, there should be no impact from nutrient loading.

   Nitrate residual could be found on rock blasted for removal during construction. If such is placed in water courses, it could provide a temporary low level source of nitrogen. Presently

c) Whenever possible, the fill material will be placed to maintain the existing hydraulic properties of the streams and wetlands.

d) Granular material will be used as a foundation for new embankments, thus maintaining flow through them.

C. SUSPENDED PARTICULATE/TURBIDITY DETERMINATIONS

1) **Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site**: The placement of fill at stream channel crossings may introduce some fine materials to the surface waters, which would cause temporary increases in the level of suspended particulates during construction. The placement of fill may also cause unnatural turbulence, which may resuspend bottom sediments. As a result, turbidity levels may temporarily increase in the vicinity of stream or wetland encroachments.

   Stormwater runoff from areas in the vicinity of streams and wetlands can also transport sediments to the surface waters. This would result in an increase in suspended particulates and turbidity levels. It will be necessary to ensure that a standard erosion control work plan is carefully established and followed to keep erosion to a minimum.

2) **Affects on Chemical and Physical Properties of the Water Column**:

   a) **Light Penetration**: Increased levels of suspended particulates and turbidity in the surface waters near the construction site can also decrease the amount of light penetration. These impacts would be short-term and would occur only temporarily during the construction activities.

   b) **Dissolved Oxygen**: The suspended particulates introduced to the surface waters by the placement of soil will be for the most part inorganic. Therefore, no additional biochemical oxygen demand (BOD) should occur. In addition, the proposed action should not result in any increased turbulence or stagnation of the surface waters to the point of affecting the dissolved oxygen levels.

   c) **Toxic Metals and Organics**: Since the fill materials used for construction would be obtained locally, they should be similar to the soils at the existing stream crossings. Water quality data for surface waters in the Bitterroot Valley indicates that toxic metals and organics are not excessive or a problem. No fill material would be taken from any hazardous material site identified in the Hazardous Material Section of the Draft EIS.

   d) **Pathogens**: There are no known major sources of viruses or pathogenetic organisms in the project area, although livestock and wildlife waste is evident in several places throughout the corridor. The use of clean, inorganic fill material would prevent introducing pathogens.

   e) **Aesthetics**: The project would affect the aesthetics of surface water in the Valley similar to the spring runoff conditions but at a much smaller scale. The effects would only be temporary, localized, and occur near or just downstream of the actual construction activities. The expected impacts are the increased suspended particulate levels in the surface waters near the placement activity which would rapidly disperse as distance from the source increases.

there are no known areas on the project where blasting of rock will be necessary. If shotrock is used for rip-rap, nitrate residuals would be quickly flushed and diluted to insignificant levels.

j) **Eutrophication**: The proposed action is not expected to contribute significant quantities of sediments or nutrients to the Bitterroot River drainage. The waters impacted by the project are primarily streams and wetlands, not lakes. Streams are generally well-mixed and plant growth induced by excessive nutrients is generally not a problem. Wetlands are, by their nature, already subject to eutrophication. Since there will be no significant increase in nutrients and the hydraulic regimes will be preserved, there should be no impacts from increased eutrophication.

2) **Current Patterns and Circulation**:

a) **Current Patterns, Drainage Patterns, Normal and Low Flows**: All the local cross-highway drainage crossings and patterns will be maintained. In areas where entirely new fills are to placed (i.e. near the Silver Bridge crossing) a foundation blanket of granular material could be constructed for the fills that would allow passage of surface water through areas not already served by culverts and bridges. Seasonal variations in stream flow and groundwater table do naturally affect flow volumes and hydraulic patterns. However, none of the proposed improvements are expected to change or alter these patterns and the total flow of water in the Bitterroot River drainage should not be altered.

b) **Velocity**: The intent of the design of the new bridges will be to maintain the existing velocities in the streams. The drainage culverts will be designed to keep velocities low enough to minimize erosion at the outfalls.

c) **Stratification**: Proposed improvements are not expected to alter the current stratification of waters in any of the streams or wetlands.

d) **Hydrologic Regime**: Improvements would not be expected to affect the hydrologic regime currently existing in the Bitterroot River or its tributaries.

e) **Aquifer Recharge**: The proposed action would not have any adverse effect on the quality or extent of the aquifer recharge.

3) **Normal Water Level Fluctuations**: Wherever possible, the bridge openings and culverts would be sized and designed to accommodate the 50-year discharges without significantly altering the stream elevation or causing backwater problems. Additionally, bridges will also be designed to safely pass a 100-year flow.

4) **Salinity Gradients**: Because there are no known locations of salinity within the project area, salinity gradients will not be a problem.

5) **Actions That Will Be Taken to Minimize Impacts**: To minimize impacts the following measures will be taken:

a) Bridge and culvert openings will be sized to maintain the existing water levels and velocities in the streams, as much as possible.

b) Culverts and hydraulic structures will be placed and sized to maintain the existing cross-highway drainage and to allow for fish passage. Additional culverts may be added to preserve or restore flow between connected or bisected wetlands.

3) **Effects on Biota**:

a) **Primary Production, Photosynthesis**: The project should not substantially lower the rate of photosynthesis and primary productivity in surface waters. As indicated in the previous section, changes in suspended particulates and turbidity levels are expected to be localized and temporary. These conditions should not be significant enough to effect the level of dissolved oxygen in the surface waters.

b) **Suspension/Filter Feeders**: Examples of collectors and filter feeders include net spinning caddis larvae and burrowing mayfly nymphs, which capture and use organic particles suspended in the water current. Due to the increased levels of suspended particulates and turbidity near construction activities, these organisms would be impacted. Excessive sediment can bury organisms, abrade their gills, and damage their habitat. However, the impacts would be very localized and short-termed. The organisms would be expected to naturally repopulate the area very quickly after the construction activities have been completed.

c) **Sight Feeders**: Sight feeders, like stonefly nymphs, rely on clear water to find their food. Therefore, they would be impacted by the short-term, localized increases in suspended particulates and turbidity due to the placement of fill materials. Similar to filter feeders, excessive sediment can bury these organisms, abrade their gills, and damage their habitat. Suspended particulates and turbidity should rapidly diminish after the actual placement of fill materials, allowing quick recovery for sight feeders.

4) **Actions Taken to Minimize Impacts**: The primary actions taken to minimize impacts resulting from suspended particulates and turbidity in the surface waters are to establish an erosion control plan. An erosion control work plan will be selected and designed to prevent or reduce erosion and release of sediment from construction areas. For this purpose, the Standard Erosion Control Work Plan for the Montana Department of Transportation will be used. Temporary, site-specific erosion control structures or practices will be selected based on best management practices (BMP's) for highway construction projects.

The work plan will be used to acquire a Montana Pollutant Discharge Elimination System (MPDES) permit. The goals of the erosion control plan will be to plan the development to fit the project setting, to avoid or minimize the extent of disturbed area and duration of exposure, to stabilize and protect disturbed areas as soon as possible in order to keep runoff velocities low, to protect disturbed areas from runoff, retain sediment within the corridor, and implement a thorough maintenance and follow-up program. BMP's used may include slope roughening, temporary seeding, mulching, erosion control blankets, straw bales, gravel filter berms, ditches, silt fences, and settling basins.

D. CONTAMINANT DETERMINATIONS

1) **Evaluation of the biological availability of pollutants in dredge or fill material**:

a) **Physical Characteristics**: The physical characteristics of any fill or dredge materials would have particle sizes and constituents very similar to those of the project area since the fill would be obtained from local sources. Fill material would be clean and free of hazardous and toxic pollutants, pathogens, and organics.

b) **Hydrography in Relation to Known or Anticipated Sources of Contamination**: The project crosses many small streams, drainages, and the Bitterroot River. Therefore, this presents the possibility of contaminants from highway runoff or accidental hazardous material spills being

introduced to surface waters. During the construction phase, storm water runoff would be controlled by an erosion control plan. By widening the highway and improving the bridge culvert crossings, the potential for accidents at these crossings would be reduced.

c) Results from Previous Testing of Material or Similar Material in the Vicinity of Project: A detailed Hazardous Materials Assessment was performed for the US Highway 93 right-of-way corridor. Although potential areas of concern were identified throughout the project corridor, no documented evidence of significant existing contamination was observed. The assessment included a physical site investigation, review of public and agency records, and maps. Several historic spills were noted but have since been cleaned up. Storage tanks exist but have not been documented as leaking. All sources of fill material used throughout the project will have the required environmental clearances.

d) Known Significant Sources of Persistent Pesticides from Land Runoff or Percolation: Although there is a fair amount of agricultural activity in the project corridor, there are no known significant point or non-point sources of pesticides present. Water quality data in the area shows no present concern for these constituents.

e) Spill Records for Petroleum Products or Designated Hazardous Substances: The hazardous materials assessment provides detailed information on spill records in the project area. In summary, a diesel fuel spill occurred in 1986 at milepost 50.0, which is near a wetland. However, the spill was cleaned up and Water Quality Bureau personnel authorized termination of monitoring the site in 1992 when they believed residual contamination no longer presented a threat to human health or the environment. Also in 1986, a fertilizer spill occurred at milepost 51.6 where a wetland exists. Water Quality Bureau personnel also considered this spill to be adequately cleaned up.

f) Other Public Records of Significate Introduction of Contaminants from Industries, Municipalities, or Other Sources: To complete the hazardous material assessment, public records were closely examined in order to find any evidence of contaminants from these sources. Although industries, municipalities, gas stations, and other businesses exist throughout the project corridor, no documented evidence of significant contamination within the right-of-way was observed in the public records.

g) Known Existence of Substantial Material Deposits of Substances that Could be Released in Harmful Quantities to the Aquatic Environmental by Man Induced Discharge Activities: As shown by the hazardous materials survey, substantial material deposits of substances that could be released in harmful quantities to surface waters by construction activities are not known to exist in the project area.

h) Other Sources of Contaminants: Other sources of pollutants that may be present in dredged or fill materials include road salts, de-icing chemicals, and dust suppressants. FHWA research has concluded that these sources have minimal impacts to receiving surface waters providing standard, acceptable construction practices are followed. Vegetation and soils play an active role in filtering, diluting, and neutralizing the pollutant levels from these sources.

2) Contaminant Determination: The material given in the Hazardous Material Assessment Report was carefully examined and it was concluded that there is no reason to expect that any proposed fill material would be a carrier of contaminants.

The fill material will be obtained from sources that have the required environmental clearances to assure that no fill material with pollutants is used on project.

An evaluation of the above information indicates that there is reason to believe the proposed dredge or fill material is a carrier of contaminants. Therefore, the material meets the testing exclusion criteria.

E. AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS

1) **Effects on Plankton**: Plankton will be primarily affected by changes in suspended sediments, turbidity, and pollutant levels resulting from the construction activities. As previously discussed, these effects will only be short-term and localized.

2) **Effects on Benthos**: The project effects on benthos were discussed in Section III, A, 4 of this evaluation.

3) **Effects on Nekton**: Nektons are aquatic organisms such as fish that are able to move independently of water current. These were discussed previously in Section III A of this evaluation.

4) **Effect on Aquatic Food Web**: Due to the proposed improvements not significantly impacting organisms at any intermediate level of the aquatic food web, the overall, long-term cumulative effect on the aquatic food web is expected to be insignificant.

5) **Effects on Special Aquatic Sites**:

   a) **Sanctuaries and Refuges**: State, federal, or local agencies have not designated any wildlife or water fowl, sanctuaries, or refuges within the project area. Therefore, none would be impacted by the project. The closest, the Metcalf National Wildlife Refuge, is located between Stevensville and Florence on the east side of the Bitterroot River which is well away from the river. Therefore, this refuge should not be impacted by the proposed improvements.

   b) **Wetlands**: The delineated amount of jurisdictional wetland acreage occurring within the study corridor is 170.1 hectares (260.5 acres). There is a variety of wetland resources in the area. Several extensive wetland areas are already bisected by the highway (and railroad). These occur at Squaw Creek (mp 75 - 80), McCalla Creek (mp 63 - 66), and Fred Burr Creek (mp 54 - 56). These areas are hydrologically tied to the Bitterroot River. The highway also crosses numerous perennial and intermittent creeks. Many of these areas are dominated by riparian communities. Wetlands typically comprise 50 to 90 percent of these areas.

   For the preferred alternative approximately 19.4 hectares (48 acres) of wetlands would be impacted as a result of the proposed action. This amount is substantially reduced from the 36.4 to 46.9 hectares (90 to 116 acres) initially estimated for the individual "build" alternatives. Substantial efforts have already been made to redesign the roadway alignment and grade to reduce impacts to this significantly lower level as discussed in the Draft EIS. Approaches to mitigate the impacts to these wetlands will be discussed in Section III, E, 9.

   c) **Mud Flats**: There are no mud flats in the project area, and the project would not create any new mud flats.

   d) **Vegetated Shallows**: These are areas that are permanently inundated and support rooted, aquatic vegetation like cat-tails and sedges. These areas are generally classified as wetlands. Approximately 36.3 hectares (89.6 acres) of wetlands in the project corridor have been identified as vegetated shallows with rooted emergent growth. Of these 36.3 hectares (89.6 acres), approximately 10.8 hectares (26.8 acres) would be impacted by the preferred alternative.

e) **Riffle and Pool Complexes**: Riffle and pool complexes occur when the gradient of the stream channel varies from steep to shallow. Most of the crossings associated with the highway are in reaches of streams where the gradient is beginning to flatten out as it approaches the Valley floor and the main stem of the Bitterroot River. There remains sufficient gradient, meanders, and cobbles and boulders to create riffle and pool complexes. However, there are a few such as McCalla Creek, Fred Burr Creek, and Squaw Creek that are sufficiently low in gradient and placid as to not have riffle/pool complexes in the vicinity of the highway crossings. Whereas bridges and other hydraulic structures will be engineered to maintain existing hydraulic characteristics, adverse impacts on these complexes are not anticipated.

6) **Effects on Threatened and Endangered Species and Their Habitat**: Habitat and foraging areas for two federally listed wildlife species (bald eagle and peregrine falcon) occur in or near the project area. Waterfowl concentrations, fish populations and carrion (primarily roadkill) are abundant and provide foraging opportunities for the eagles and falcons. Nesting habitat for the bald eagle is also present.

A detailed Biological Assessment of the project's impact on threatened and endangered species has been prepared and is being reviewed by the USFWS. It indicates no adverse impacts on threatened or endangered species are associated with the proposed action and USFWS is expected to concur.

7) **Effects on Other Wildlife Mammals, Birds, Herptiles, Fish, Invertebrates, Candidate Endangered Species, State Endangered Species, and Species of Special Interest or Concern and their Habitat**: A diversity wildlife habitat and use occurs in and near the study corridor. Most outstanding is the amount of wetland and riparian habitat. These areas provide habitat for a variety of wildlife, such as the neotropical migrant song birds, waterfowl, raptors, small mammals, and white-tailed deer. Fox and coyote also occur within the project area. A Biological Assessment has been prepared to evaluate the project's impact on the wildlife in the area. A separate field study was also conducted to specifically address deer roadkill within the project area. Although deer mortality from vehicle collisions will likely continue, the assessment concludes there will be no adverse impacts to wildlife resulting from the proposed action.

Two sensitive species listed by the Forest Service that have a potential to occur within the project are the bulltrout and the westslope cutthroat trout. Impacts to these species from the proposed action were evaluated in the Biological Assessment and were found to be negligible since they occur in upstream reaches, well away form the project corridor.

8) **Actions Taken to Avoid and Minimize Impacts**: According to the Clean Water Act, Section 404 Guidelines, and the State of Montana's Interagency Memorandum of Understanding (1992), permit issuance will only be allowed for the least environmentally damaging, practicable alternatives. No discharge of materials into wetlands or waters of the United States can be permitted if there is a practical alternative to the proposed discharge, which would have less adverse effects to the aquatic ecosystem and as long as the alternative did not have other significant adverse environmental consequences. Therefore, the preferred alternative, identified in the Draft EIS, was carefully selected to represent the least damaging, practicable alternative.

After initial evaluations of "build" alternatives indicated potential wetland impacts on the order of 36.4 to 46.9 hectares (90 to 116 acres) for the 56.3 km (35 mi) corridor, it was determined by MDT and the Interagency Wetland Group that further efforts at avoidance were required. Accordingly, the alignment and grade of the preferred alternative were carefully re-engineered to first maximize avoidance and then to minimize unavoidable impacts to the extent possible.

The results of this effort are commendable -- unavoidable wetland impacts have been reduced to 19.4 hectares (48 acres) for the 56.3 km (35 mi) corridor. Compensatory mitigation including 1:1 replacement of acreage and replacement or enhancement of wetland functions and values is being developed. The hydraulic and hydrologic character of the corridor present ample opportunity for constructing new wetlands and a successful mitigation project has already been constructed by MDT and cooperative agencies on the Lee Metcalf National Wildlife Refuge. Efforts are currently underway to develop a 20.2 hectares (50 acres) wetland replacement site with specific vegetation and monitoring plans to demonstrate achievement of replacing or enhancing functions and values lost through impacts to wetland areas resulting from the proposed action.

Additional efforts to minimize impacts to wetlands are as follows:

a) Whenever possible, steeper sideslopes and smaller fill volumes will be used for construction in wetlands and at stream crossings.

b) Fill material will be used that is similar to the existing substrate in particle size and constituents. Only fill material from sources with the appropriate environmental clearances will be used.

c) MDT's Highway Construction Standard Erosion Control Work Plan will be used to identify Best Management Practices for control of erosion and sediment transport both in areas potentially impacted and in nearby areas avoided.

d) All disturbed areas will be restored to an acceptable condition. This will include mulching, reseeding, and the use of other erosion control or best management practices.

e) Lengthening of bridges or guardrail may be considered in riparian crossing areas to minimize fill in these areas.

f) Any water pumped from inside cofferdams will go to a settling pond before it is reintroduced to the surface waters.

g) Any unavoidable construction related to disturbances will be timed, whenever possible, to occur during periods that will create the least damaging impacts.

Other measures will be taken to minimize environmental impacts of the proposed project. These measures are further discussed in the Draft EIS.

9) **Compensatory Actions Taken to Mitigate Impacts**: Although all possible action will be taken to avoid and minimize impacts to wetlands and surface waters, some compensatory mitigation will still be required. It is the current policy of the Environmental Protection Agency and the Department of Army - Corps of Engineers to provide compensatory mitigation in areas adjacent or within the project area whenever possible. After these efforts are exhausted, then off-site compensatory mitigation should be pursued.

The over-riding concept of compensatory mitigation is to replace or mirror functions and values of wetlands that will be unavoidably lost through the proposed action. The approach to compensatory mitigation is being developed by MDT in concert with the Montana Interagency Wetlands Group, which includes representatives of State and Federal agencies. The approach adopted by MDT policy is to follow a sequence of compensatory mitigation -- to first look at developing replacement wetlands on-site, then look at off-site opportunities, and as a last resort considering "banking" if additional replacement is still required.

It is recognized that replacement of a natural wetland community is a difficult and challenging process that requires a lengthy period of time, careful design, thorough development of vegetation plans, and constant monitoring to evaluate the success and to modify the plans where measures have not met with success.

While other considerations are discussed below under off-site mitigation, the key to any replacement or enhancement option is to maintain or establish a reliable source of water to the new area. Even though wetland hydrology is the most difficult parameter to replicate or create in newly constructed wetlands, it is felt the prevailing conditions in the project corridor (and Bitterroot Valley) are conducive to providing both surface and groundwater sources that can be utilized to increase the chances for long-term success in wetland mitigation.

Surface water sources are abundant in the streams flowing down from the Bitterroot Mountains across the study corridor to the Bitterroot River. Groundwater also makes its way through sand and gravel layers interspersed with clay lenses that perch the groundwaters at relatively shallow levels throughout much of the area. It is these very conditions that have created the frequency of wetland occurrences in the project area and the prevalence of such conditions greatly increases the chance for successful mitigation.

In fact, such has already occurred at the Lee Metcalf National Wildlife Refuge that is adjacent to and immediately east of the project corridor. MDT and other agencies collaborated on a project to expand existing wetlands at that site. The result has been very successful in replicating, and to some extent enhancing, functions and values present in the adjacent, naturally occurring wetland areas. Thirteen hectares (32 acres) are available as credit for compensatory mitigation.

A description of the sequential considerations for compensatory wetland mitigation follows:

a) **On-Site Mitigation**: The definition used for on-site mitigation is any areas within reasonable proximity (1.6 km [1 mi]) of a disturbed wetland area. Use of on-site mitigation has generally been discouraged by the biological experts who studied the corridor. Presently, there is a high incidence of deer kill resulting in over $700,000 of property loss annually within the Bitterroot Valley. A special study on the deer kill problem was commissioned and coordination and collaboration between that study, representatives of the Montana Department of Fish, Wildlife and Parks, and those responsible for completing the Wetlands Evaluation and Biological assessment all concur that wetlands in close proximity to the highway contribute to the deer kill problem potential; therefore accentuating monetary losses from property damage.

   However, there are thin ribbons of wetlands along the borrow areas of the existing highway. These areas are low in function and value with regard to wildlife habitat and are generally felt to be non-consequential in relation to the deer kill problem. However, they do provide important functions and values in terms of sediment storage, filtration, and nutrient removal from roadside runoff. These areas occur as a natural consequence of highway construction and will likely be recreated when new borrow ditches along the widened highway are constructed (or can be purposefully designed for such).

   Proper coordination during engineering design, coupled with development of aggressive wetland vegetation plans and a thorough monitoring program should assure the successful recreation of many of these areas with functions and values matching existing conditions.

   Another opportunity for on-site mitigation could be the enlargement of existing wetland areas adjacent to the highway that are not directly impacted by new construction. Perennial and intermittent water sources are common in these areas together with hydrologic, soil conditions, and vegetation similar to the adjacent site. In most cases, it would be a straightforward matter

of purchasing additional property or obtaining land owner permission to excavate the border areas to match elevations in the existing wetland and aggressively revegetate them with similar plantings.

It may be possible to expand or enhance the area around sites 15, 28, 35, 38, 61, 65, 66, 69, 70, and 71, as shown on wetland maps in the EIS. Other potential areas include between milepost 80 and 81 on the east side of the highway and old gravel pits near milepost 57, although they would likely need to be sealed and inundated with water only to a shallow depth. Many suitable wetland plant species are already available on site for propagation and planting.

Other opportunities for enhancement of existing wetlands exist. This could be accomplished by improving the hydraulic flow regimes, excavation to allow greater influence of surface water, and/or planting of additional species to provide habitat and cover. While such enhancement does not provide for 1:1 replacement of lost areas, it can provide for improvements in the functions and values of the wetland.

b) **Off-Site Mitigation**: Off-site mitigation is defined as greater than one mile from the disturbed area but within or near the study corridor. For the purposes of this project, the study corridor is approximately 3.2 to 4.8 km (2 to 3 mi) wide extending from the base of the Bitterroot Mountain foothills on the west, eastward to the Bitterroot River. US 93 essentially bisects this corridor through the length of the project. In looking at potential mitigation sites, it is important to identify criteria that will contribute to successful implementation and long-term performance for the functions and values required. Although not necessarily in order of priority, the following criteria have been established and will be considered in selecting potential off-site mitigation areas:

- Land use and growth - the west side of the Valley (the side the highway passes) has been largely developed or will be developed into subdivisions or tract development. Figure 4-6 in the EIS shows the areas developed or platted for development sometime in the future. Areas where the ground is not platted for development is primarily due to its non-developable nature (floodplains or wetlands).

  To assure the success of off-site mitigations it will be necessary to avoid the future development areas minimizing the man/biota conflict that would otherwise arise. From the Figure it appears the mitigation opportunities are more prevalent on the east side where the Valley floor is flatter, the incidence of ponded surface water is greater, and large blocks of undevelopable land are available to preserve extensive habitat and provide greater potential for successful wetland mitigation.

- Longevity - Similar to the land use and growth discussion, wetland mitigation should be developed in areas offering the opportunity for perpetuity. Areas associated with the floodplain of the Bitterroot River will not only be replenished by surface waters on a continuing basis but by virtue of their location in the floodplain will be protected essentially forever from human development encroachment.

- Groundwater - The hydrology of the study area is very unique. The water table is higher in the summer due to irrigation than during the winter. The geologic setting and soil stratification are conducive to perched shallow water tables that are an essential ingredient in wetland establishment and growth. Groundwater maps are available (Figure 3-2 of the EIS) that clearly show areas of shallow groundwater. Additional drilling can be conducted to verify the presence and availability of groundwater at a given site. This mapping can be overlain on the land use and growth maps to quickly identify the areas with maximum conditions conducive to successful wetland establishment.

Having already examined these conditions, project biologists feel there is substantial opportunity for successful mitigation.

- Distribution of "Refuge" Areas - Since wetland habitat exists throughout the Valley and the study corridor in particular, it would be advisable to assure distribution of replacement refuge areas. This distribution may help assure the success of mitigation efforts by utilizing a number of different sites to take advantage of the resources available and reducing the chances of developmental impacts affecting a large volume of wetlands all at once if the site were in only one area.

Several private land owners with suitable sites for wetland development in accordance with the foregoing criteria have been in contact with project personnel and MDT. Additionally, a local Land Trust organization has identified several other land owners that have potential interest in wetland development. Presently the most promising option is development of the Les Schwab Site where the foregoing criteria are met and there appears to be an opportunity to develop about 20.2 hectares (50 acres) of wetlands in a single block. The land owner has not only shown interest but has become pro-active in coordination and development efforts to help assure successful wetland creation.

Successful on- or off-site mitigation will require careful attention to specific design details of the wetland areas in terms of hydraulics and hydrology, the establishment of an aggressive vegetation plan utilizing indigenous wetland material from nearby complexes, and the development of a thorough monitoring plan that will provide for mid-course corrections as needed. The monitoring plan would basically allow a two to three year period to observe the success of the vegetation plan and would continue to monitor the successful growth and survival over perhaps a five or even ten year period to assure the mitigation "takes" and will preserve aquatic resources and functions and values in the long-term.

c) **<u>Wetland Banking</u>**: The last option of compensatory mitigation is the establishment of a wetland bank. Although similar in criteria, development, and establishment as the off-site mitigation described in the foregoing section, the wetland banking would generally be considered as being outside the project corridor and probably larger in size (acreage). Banking attempts to maximize the mitigation and improve the efficiency of developing large areas of wetland mitigation in a single effort.

Although banking has successfully been accomplished in other areas of the Bitterroot Valley, biologist feel the opportunities for successful off-site mitigation are high enough that wetland banking may not need to be considered. While MDT biologist are keeping an eye on banking opportunities (and their potential to satisfy the compensatory mitigation requirements of several individual highway projects), the current main emphasis is on successful development of on- or off-site mitigation areas.

10) **<u>Monitoring of Mitigative Actions</u>**: To ensure compliance with wetlands policy and increase the chance for successful mitigation efforts, inspections will be made by the Project Manager, MDT's Wetland Biologist, and other interested agency representatives before, during, and after the wetlands replacement. These inspections are likely to occur as follows:

a) During the plan-in-hand visit prior to initiating development of the wetland.
b) At a visit made prior to the final grading for the wetlands.
c) When the wetland is planted.
d) The first full summer after the completion of the wetlands construction to determine the preliminary success of the project.
e) Interim inspections for each of the next three to four growing seasons.

f) A final inspection in the fourth of fifth season after establishment of the wetland area to obtain enough data and observation to determine whether or not the mitigation has been successful. If not, plans can be formulated for correction or a decision made to abandon the site and try elsewhere if solutions to assure success at the site are not apparent.

Implementation of the proposed action will also be field-reviewed during construction by various agencies including MDT, the Corps of Engineers, the State of Montana - Water Quality Bureau, and the Montana Department of Fish, Wildlife, and Parks to ensure that the construction activities will not unacceptably impact surface waters or wetlands, that impacts requiring additional mitigation beyond that being foreseen and proposed are not being created, and that provisions of all the permits issued are properly being met.

F. PROPOSED DISPOSAL SITE DETERMINATION

1) Mixing Zone Determination:

a) **Depth of Water at the Disposal Site**: The depths of water at the disposal sites for this project vary considerably from season to season and from one site to the next. The depth of the non-riparian wetlands is relatively shallow (0 to 0.6 m [0 to 2 ft] deep). The depth of water at the minor stream and drainage crossings is generally 0.3 to 1.2 m (1 to 4 ft) deep. The depth of water at the Bitterroot River crossing can be as high as 3.0 to 3.7 m (10 to 12 ft).

b) **Current Velocity, Direction, and Variability at Disposal Site**: The current patterns and circulation patterns associated with the disposal sites are discussed in Section III, B, 1 of this evaluation.

c) **Degree of Turbulence**: Minor, localized, and temporary turbulent conditions could possibly be created by the discharge of the fill materials into surface waters or by the temporary construction of cofferdams or work platforms for bridge piers or abutments.

d) **Water Column Stratification**: The majority of the surface waters affected by the proposed action are flowing, well-mixed streams and rivers. The project's impact to stratification patterns will be insignificant.

e) **Discharge Vessel and Speed**: This consideration is not applicable to this project.

f) **Rate of Discharge**: See Section II.E.5 of this Report.

g) **Ambient Concentration of Constituents of Interest**: Existing water quality of the Bitterroot River and its tributaries is very good as discussed in Section 3.3 of the EIS. Accordingly, there are no significant ambient concentrations of any constituents of interest and none are anticipated to result from the placement of fill material.

h) **Dredged or Fill Material Characteristics**: The characteristics of the proposed fill materials are discussed in Section III, D, 1 of this evaluation.

i) **Number of Discharges per Unit of Time**: See Section II.E.5 of this Report.

j) **Other Factors Affecting Rates and Patterns of Mixing**: No other unusual factors or consequences are expected at any disposal sites.

2) **Evaluation of the Appropriate Factors in F(1) above**: An evaluation of the appropriate factors indicates that the disposal sites and sizes of mixing zones are acceptable.

3) **Actions to Minimize Adverse Discharge Effects**: All appropriate and practicable steps will be taken through application of recommendation of Section 230.702 through 230.77 to ensure minimal adverse effects of the proposed discharges. These actions are listed elsewhere in this evaluation and in Section 4.9 the Draft EIS.

4) **Potential Effects on Human Use Characteristics**:

   a) **Municipal, Private, and Potential Water Supply**: The only anticipated significant effects of the project on water quality in the Bitterroot Valley is to increase the level of suspended sediments and turbidity in the surface waters. However, these increases are expected to be much less than those that naturally occur during spring runoff conditions or major rainfall events. Neither the quantity or quality of municipal and private water supplies would be affected by the proposed action since area water supplies come exclusively from groundwater sources.

   b) **Recreational and Commercial Fisheries**: The project waters do not support harvestable fish, crustaceans, shellfish, or other aquatic organisms that would support commercial fisheries. However, there is some recreational sport fishing for cutthroat trout, brown trout, rainbow trout, and other fish. Construction activities will be timed to avoid, whenever possible, sensitive periods when fish populations could be damaged. The project could temporarily and locally disrupt fish habitat, thus causing some short-term displacement of fish. This type of impact is expected to be insignificant and will not have a long-term impact or a cumulative impact on the project area's fisheries. The Draft EIS and the Biological Assessment discuss these impacts in more detail.

   c) **Water-Related Recreation**: Recreation fishing was discussed in the previous section. Canoeing and boating are other water-related recreational sports taking place primarily on the Bitterroot River. During bridge construction, some access to these activities may be temporarily disrupted due to necessary detours.

   d) **Aesthetics of the Aquatic Ecosystem**: The aesthetic value of the aquatic ecosystems in the Bitterroot Valley is very high. Because the proposed project would involve the placement of fill in wetlands and streams, there is a potential that the aesthetic quality will be affected. However, effects are expected to be short-termed and very localized. By restoring and revegetating all disturbed construction areas and fill embankments, the new material will quickly become part of the natural landscape and blend with the surrounding terrain. No significant impact to the value of private property near aquatic areas is expected. Existing accesses to the river will be maintained and enhanced where desirable (e.g. Bass Creek fishing access).

   e) **Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, Refuges, Sanctuaries, and Similar Preserves**: The project's impact on these sites is fully discussed in the Draft EIS. The only sites of importance connected with the waters of the Bitterroot Valley are the historic site where Lewis and Clark camped on the Bitterroot near the mouth of Lolo Creek and the Lee Metcalf National Wildlife Refuge that borders the Bitterroot River. The proposed action will not affect these sites.

      The Bitterroot River is not currently on the federal list of Wild and Scenic Rivers or the list of Study Rivers. The project would not affect the river in any way to diminish the potential for future eligibility for either list.

G. DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM

Cumulative impacts are the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material. Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such changes can result in degradation of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems.

Past losses of wetland and aquatic resources in the area and region have resulted primarily from the direct conversion of wetlands to developmental uses such as agricultural and residential/commercial development. Highway improvement projects also contributed to a lesser extent to these losses up to the time that regulations protecting wetlands were adopted and became law.
Since the time of adoption of these regulations, all federally funded projects (including nearly all transportation projects of consequence in the area and region) have been required to first avoid, then minimize, then mitigate for wetland impacts resulting in no net loss of wetlands and aquatic resources. As discussed in this evaluation, the current proposal is governed by these regulations and appropriate steps for eliminating and reducing adverse impacts have been and are being taken to the extent possible.

The primary source of adverse impacts to wetlands and waters of the United States comes from outright loss through current development pressures and degradation of functions and values through encroachment of new developments. Private wetlands are being filled in for projects developed locally with private funds that currently are exempt from wetland regulations. Conversion of wetlands to agricultural uses is another example of this situation.

More development creates more opportunity for both point and non-point sources of pollution degrading surface water quality and threatening aquatic resources. Timber sales and increased mining activity create an indirect potential for adverse impacts through runoff from these areas potentially degrading water quality.

All federally funded future actions are subject to the requirements of Section 404 of the *Clean Water Act* and thus will be developed in such a way as to avoid, minimize, or effectively mitigate impacts to wetlands and waters of the United States. This includes federally funded highway projects. It is anticipated the breadth of wetland protection regulations will be expanded and the corresponding restrictions will be tightened to include regulation of private and agricultural development to the point that their direct impacts and losses of wetlands will either be avoided, minimized, or wholly compensated through mitigation. Indirect impacts such as increased surface runoff with its attendant potential for water quality degradation may become a further problem unless a corresponding increase in regulations governing such runoff is adopted.

As clearly set forth in the EIS, the pressures for growth and development in the project area and region in general result from economic conditions, market forces, affordability of land and housing, aesthetic appeal of the area, and other conditions totally unrelated to implementation of transportation improvements. Thus, the pressures for increased development and cumulative impacts it represents are more related to local growth and land use issues independent of transportation or highway improvements.

H. DETERMINATION OF SECONDARY EFFECTS ON THE AQUATIC ECOSYSTEM

These secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials but do not result from the actual placement of the dredged or fill material. The most significant secondary effect potentially involved with this project results from surface runoff. For this reason, a Highway Construction Standard Erosion Control Work Plan will be established to prevent surface runoff from transporting materials that could potentially degrade water quality.

Another secondary effect is the potential for accidental spills of hazardous materials during construction activities and the subsequent use of the facility. Any improvements to the existing highway that increase capacity and reduce congestion would decrease the chance of these accidental spills resulting from the use of the highway by vehicles transporting hazardous materials. Other secondary or indirect effects of the project are discussed in more detail in the Draft EIS.

If the preferred alternative is implemented, more sand and de-icing materials would be required to cover the larger surface area (additional lanes). Therefore, sediment traps with a scheduled maintenance program to clean the traps periodically may be constructed. A well-established vegetative cover on the sideslopes would also help prevent sedimentation from entering the stream/wetland systems.

SECTION IV. FINDINGS OF COMPLIANCE

A. ADAPTION OF THE SECTION 404(b)(1) GUIDELINES TO THIS EVALUATION

This evaluation is based on a conceptual and preliminary design of the project alternatives and identifies and quantifies the environmental impacts associated with the proposed action insofar as present design data allows. Before the project can be advanced to the design stage, the preferred alternative must be approved and a formal design for it must be developed and approved.

Some project specific information required for the Section 404(b)(1) evaluation may not be accurately predicted until final design plans are available.

B. EVALUATION OF AVAILABILITY OF PRACTICABLE ALTERNATIVES TO THE PROPOSED DISCHARGE SITE WHICH WOULD HAVE LESS ADVERSE IMPACT ON THE AQUATIC ECOSYSTEM:

Section 230.01(a) of the Guidelines states "except as provided under 404(d)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." A discussion of the alternatives evaluated with respect to this requirement follows.

The EIS clearly documents the "no action" alternative would have serious environmental consequences and would not provide for meeting the stated purposes and needs for transportation improvements; therefore it is not practicable.

Although implementation of a park-and-ride system has been recommended as part of the preferred alternative to reduce traffic on the highway and provide for further encouragement of traffic reduction measures, none of the "no build" alternatives (including park-and-ride) can meet the stated purposes and needs for transportation improvements either individually or taken in any combination. The EIS discusses the fact that conditions conducive to encouraging ridership of public transportation are virtually non-existent in the Bitterroot Valley. A study of traffic reduction measures (including public transportation systems) and public opinion surveys and responses indicate that anticipated ridership will be very low; therefore their implementation will not suffice to meet the needs for reduced traffic congestion, increased safety, and improved transportation efficiency (among other stated purposes and needs). Therefore, adoption of these alternatives or combinations thereof are not practicable.

The modified 2-lane "build" alternative provides for reduced traffic congestion and improved efficiency in localized areas. However, traffic in the opposite direction and traffic in areas where a second lane is not added will still be congested, will still have a higher accident potential, and will not meet the other stated objectives for transportation improvements. Although the physical dimensions of the alternative reduce the extent of direct environmental impacts, construction of the additional lane in limited stretches actually produces a more serious environmental consequence as drivers make the mad dash to take advantage of the passing lane and then jockey for position as the highway narrows back from two lanes to one, severely increasing the potential for accidents. The capacity and safety limitations of this alternative cannot meet the stated purposes and needs either by itself or in combination with other "build" or "no build" alternatives; therefore it is not practicable.

Closer examination of Table 3 in this evaluation reveals a least damaging alternative resulting from the correct combination of the four basic "build" alternatives. In essence, the alternative producing the least direct impact to wetlands and waters of the United States at a given individual wetland site could be adopted so the combined effect when added together would provide the least impact. This combination

would yield a direct impact of 16.5 hectares (40.9 acres). However, this design would require a nearly random and patchwork combination of 2-lane modified, 4-lane divided, 4-lane undivided, and 5-lane facility. There is no practicality in accomplishing this either in meeting the stated purposes and needs or for the adverse environmental impact resulting from the chaos this would cause in both design and highway safety.

Dropping the 2-lane modified alternative, since it has been established it will not meet the stated purposes and needs, examination of the remaining three principal alternatives would suggest the 4-lane undivided alternative would then become least environmentally damaging. Indeed, adoption of the 4-lane undivided alternative seems to be most practical in the vast rural and undeveloped areas of the project corridor and does in most cases represent the least environmental impact.

However in developed areas requiring a higher degree of access, the 4-lane alternative creates an adverse environmental impact in terms of access (and related social and economic impacts) and safety. Where there is a high demand for turning movements and access in these developed areas the EIS clearly indicates use of the 5-lane facility (4-lanes with center two-way turning lane) minimizes these potential environmental impacts, increases safety, reduces congestion, and removes the barrier effect. Therefore, the 4-lane undivided in these areas is not practicable and the 5-lane option offers the better solution, more thoroughly meeting the stated purposes and needs, while offering an appreciable reduction in other environmental impacts over the 4-lane undivided alternative.

Adoption of the preferred alternative with its specific elements is a direct result of assembling the combination of least environmentally damaging and most practicable alternatives at any given location within the corridor. Thus the preferred alternative also represents the environmentally preferred plan. Elements and their considerations are:

- Construction of a park-and-ride system will help reduce traffic and encourage future traffic reduction measures as the success of this system becomes apparent and more users are enticed to take advantage of its benefits.

- Construction of 4-lane undivided highway in undeveloped and rural areas of the corridor meets the purposes and needs while providing for minimum physical, direct, and indirect impacts on the environment, including wetlands and waters of the United States.

- Construction of 5-lane highway in "urban" areas of the corridor is the only practicable alternative to meet the stated purposes and needs and minimize environmental impacts.

- The adoption of restrictive access control policies in conjunction with 4-lane segments and permissive access control policies with 5-lane segments will discourage further growth and development of undeveloped and agricultural lands (resulting in reduced adverse environmental impacts to wetland areas) and encourage densification of existing developed areas where such growth can be safely and acceptably accommodated by existing facilities.

- Realignment of the highway at Silver Bridge will allow a better stream crossing, reducing adverse hydraulic impacts presently occurring (negatively affecting aquatic resources) and providing increased safety through elimination of substandard curvature and restricted horizontal and vertical clearance. Similarly, adoption of the Bass Creek Hill realignment physically pulls highway improvements westward away from wetland areas avoiding impacts altogether.

Development of the preferred alternative has been made after considerable public involvement, lengthy coordination and interaction of Interdisciplinary Team members (some of whom are specifically charged with protection of wetlands and waters of the United States), and approval from Advisory Committee members who are chosen representatives of local civic and citizen groups. The charge to each of these

entities was to examine the impact studies related to proposed improvements in the transportation corridor and come up with the most practicable, least environmentally damaging alternative. This has been done through development and recommendation of the preferred alternative reviewed in this analysis and set forth in the EIS.

Furthermore, the preferred alternative has been carefully engineered first to avoid impacts to wetlands and waters of the United States (a reduction of over 50% from initial preliminary engineering), secondly to minimize the impacts through the application of such techniques and criteria as can be applied without jeopardizing safety, and lastly to provide a specific plan for compensatory mitigation -- sequentially looking at on-site/off-site replacement, and banking (if necessary).

C. COMPLIANCE WITH APPLICABLE STATE WATER QUALITY STANDARDS

Provided that the following permits were issued, the project would be in compliance with the State Water Quality Standards:

1) A Montana Stream Protection Act Permit (124 permit) must be issued by the Department of Fish, Wildlife, and Parks of the State of Montana (MFWP). The purpose of the permit is to protect and preserve fish and wildlife resources in their natural existing state. MFWP will examine application information including projected impacts and determine if the proposed action can be approved. Issuance of the permit constitutes compliance.

2) A short-term exemption from Montana's Surface or Water Quality Standards (3a authorization) will be required. The Department of Health and Environmental Sciences (MDHES) Water Quality Bureau will issue this permit. The purpose of the law is to protect water quality, minimize sedimentation, and provide short-term exemptions from water quality standards to certain activities carried out in accordance with conditions prescribed by MDHES. Approval of the application (outlines potential impacts) and issuance of the permit constitutes compliance.

3) The Montana Floodplain and Floodway Management Act will require Floodplain Development permits issued by the Floodplain Administrators for Ravalli County and Missoula County. The purpose of this law is to restrict floodplain and floodway areas to uses that will not be seriously damaged or present a hazard to life if flooded; thereby limiting the expenditure of public tax dollars for emergency operations and disaster relief. Application for the permit provides specific engineering information to evaluate potential impacts and approval of the application and issuance of the permit constitutes compliance.

4) The project will require a Montana Pollutant Discharge and Elimination System permit from the Montana Department of Health and Environmental Sciences Water Quality Bureau. The purpose of this law is to minimize soil erosion and sedimentation; therefore maintaining water quality and protecting aquatic resources. Specific plans for stormwater pollution prevention are developed and submitted for review by MDHES, demonstrating how and where best construction management practices will be used to minimize the potential for adverse impacts to aquatic resources. Approval of the plan and establishment of such additional conditions as may be necessary through issuance of the permit constitute compliance.

5) Section 401 of the Clean Water Act requires that the State of Montana's Water Quality Bureau certifies that any discharges into State waters will comply with water quality standards before Federal permits or licenses are granted. The purpose of this law is to restore and maintain the chemical, physical, and biological integrity of Montana's surface waters. MDHES will review plans for construction of a given project as well as reviewing the status of other permits requested from and

issued by other agencies before approving the proposal. Issuance of the permit constitutes compliance.

In all cases, review of proposed plans and potential impacts associated with implementation of the proposed action may require agencies to request modification of the design, implement mitigation measures, or meet other specified requirements before compliance is achieved through permit issuance. Strict adherence to the permits and their associated provisions and conditions constitute compliance during construction and after for the life improvement. Unapproved deviations or non-adherence to these conditions would constitute non-compliance with the law, requiring the owner to take corrective action or face associated penalties or civil action.

As long as acceptable construction practices and design procedures are followed, the acquisition of these permits should be fairly routine. Best management practices will be identified using MDT's Highway Construction Standard Erosion Control Work Plan to ensure compliance with the State of Montana's Water Quality Bureau's Pollutant Discharge Elimination System regulations.

The Draft EIS further discusses the project relative to the State of Montana's Water Quality standards. Contractors will be required to strictly adhere to the provision of all permits and regulations.

The project is in compliance with the following federal water quality standards:

a) **Clean Water Act, as Amended (Federal Water Pollution Control Act), 33 USC 1251 et seq**: The project is in compliance. Although Section 404 permit processing has not be initiated, FHWA has already been in contact with the US Army Corps of Engineers and the US Environmental Protection Agency and early coordination is allowing proper planning to meet all requirements.

b) **Fish and Wildlife Coordination Act, as Amended, 16 USC 661, et seq**: In compliance. The Montana Department of Fish, Wildlife and Parks and the US Fish and Wildlife Service were contacted and their comments have been incorporated into the Draft EIS.

c) **Floodplain Management (Executive Order 11988)**: In compliance. The project will be design to not have significant effects on floodplains.

d) **Protection of Wetlands (Executive Order 11990)**: In compliance. The project will involve work below the highwater line but appropriate measures to first avoid, then minimize, then compensatorily mitigate impacts have been established. An only Practicable Alternative Finding will be issued.

The following federal water quality standards are not considered to be applicable to this project:

a) **Coastal Zone Management Act, as Amended, 16 USC 1531, et seq.**: This Act is not applicable because the project area does not involve a coastal zone.

b) **Estuary Protection Act, 16 USC 1221, et seq**: This Act is not applicable because the project does not involve an estuary.

c) **Federal Water Project Recreation Act, as Amended, 16 USC 460-1(12) et seq**: This Act is not applicable because the project is not considered to be a water recreation project.

d) **Marine Protection, Research, and Sanctuaries Act, 33 USC, 1401, et seq**: This Act is not applicable because the project does not involve the discharge of materials into the ocean.

e) **Rivers and Harbors Act, 33 USC, 401, et seq**: This Act is not applicable because the project would not place obstruction in a navigable waterway.

f) **Watershed Protection and Flood Prevention Act, 16 USC 1101, et seq**: This Act is not applicable because the project does not involve the construction of dams in an upstream watershed.

D. COMPLIANCE WITH APPLICABLE TOXIC EFFLUENT STANDARD OR PROHIBITION UNDER SECTION 307 OF THE CLEAN WATER ACT

Section 307 of the Clean Water Act imposes effluent limitations or prohibitions on discharge of materials containing toxic pollutants into surface waters, specifically aldrin/dieldrin, several DDT compounds, endrin, toxaphene, benzidine, and polychlorinated biphenyls (PCB). The project will not discharge any of these specified toxic pollutants; therefore it will be in compliance with Section 307 of the Clean Water Act.

E. COMPLIANCE WITH ENDANGERED SPECIES ACT OF 1973, AS AMENDED

A biological assessment (BA) has been prepared for this project that addresses impacts to threatened and endangered species. The BA concluded that the project would not adversely affect the endangered bald eagles or peregrine falcons that occur in and near the project area. The US Fish and Wildlife Service has reviewed the Biological Assessment and has issued concurrence.

F. COMPLIANCE WITH SPECIFIC MEASURES FOR MARINE SANCTUARIES DESIGNATED BY THE MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT OF 1972

Due to the fact that this project does not involve the ocean, this act is nonapplicable.

G. EVALUATION OF EXTENT OF DEGRADATION OF THE WATERS OF THE UNITED STATES

Each of the following sections have previously been discussed in this evaluation. The following statements represent the conclusions of these discussions.

1) **Significant Adverse Effects on Human Health and Welfare**: This project will not adversely affect municipal or private water supplies, recreation and commercial fisheries, aesthetics, or water-borne disease rates. Although temporary water quality degradation associated with turbidity and sedimentation would occur during construction, no long-term adverse impacts on water quality or the human environment are anticipated.

2) **Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems**: Short-term temporary disruption to wildlife habitat, benthos, invertebrates and vertebrates, photosynthesis, plankton, and sight feeders are expected to result from the turbidity and sedimentation caused by construction. However, this project would not significantly or adversely produce long-term effects on the life stages of aquatic organisms or other wildlife dependant upon aquatic ecosystems.

3) **Significant Adverse Effects on Aquatic Ecosystem, Ecosystem Diversity, Productivity, and Stability**: This project would not produce significant adverse effects on the diversity, productivity, or stability of the aquatic ecosystems in the project area.

4) **Significant Adverse Effects on Recreational, Aesthetic, and Economic Values**: This project would not have a significant adverse effect on the recreational, aesthetic, or economic value of any waters of the United States or aquatic ecosystems in the project area.

H. APPROPRIATE AND PRACTICABLE STEPS TAKEN TO MINIMIZE POTENTIAL ADVERSE IMPACTS OF THE DISCHARGE ON THE AQUATIC ECOSYSTEM

The measures taken to minimize the potential adverse impacts of the discharge on the aquatic ecosystems have previously been described in this evaluation. To summarize, the most significant impact of the proposed project would be the potential for erosion of disturbed areas to produce increased levels of suspended sediments and turbidity in the surface waters. To minimize these potential and adverse impacts during and after construction, a Highway Construction Standard Erosion Control Work Plan will be established to identify and assure implementation of Best Management Practices. General steps to minimize potential adverse impacts include:

1) Ensure that the project conforms to the natural existing characteristics of the aquatic ecosystem and surrounding terrain.

2) Limit the duration and the area of disturbed land.

3) Restore and reseed the disturbed areas immediately after construction.

4) Control storm runoff by reducing velocities, retaining sediments, and properly maintaining erosion control features.

5) Ensure proper maintenance of erosion control structures and methods.

6) Time disturbances of the aquatic ecosystem to avoid sensitive periods such as breeding, migration, etc.

7) Emphasize the avoidance and minimization of impacts to wetlands before the mitigation of wetlands.

8) Assure perpetuation of wetland functions and values.

9) Employ additional measures as discussed in detail in the Draft EIS.

I. CONCLUSIONS

On the basis of the guidelines, the proposed disposal sites for the direct discharge of dredged or fill material is specified as complying with the requirements and the guidelines, with the inclusion of appropriate and practicable conditions to minimize pollution or adverse effects on the aquatic ecosystem. These conditions are discussed in Section H above.

SECTION V. EVALUATION RESPONSIBILITY

Prepared By: ______________________

Date: ______________________

Reviewed By: ______________________

Date: ______________________

U.S. Highway 93
HAMILTON TO LOLO
ENVIRONMENTAL IMPACT STATEMENT

APPENDIX D

PERTINENT CORRESPONDENCE

State Historic Preservation Office
Montana Historical Society
1410 8th Avenue · PO Box 201202 · Helena, MT 59620-1202 · (406) 444-7715 · FAX (406) 444-6575

RECEIVED SEP 05 1995

August 28, 1995

Winston Dyer
Forsgen
POB 1032
West Yellowstone, MT 59758

RE: Draft EIS; Hamilton to Lolo

Dear Mr. Dyer:

The preliminary draft EIS sent 08/21/95 states that the MT SHPO has not responded to consultation with comments. Please see attached comments provided under 36CFR800 to the lead agency for this project, MDOT. Please correct the statements in the EIS regarding cultural resources and SHPO. 1

To the best of our knowledge we now anticipate further consultation with MDOT regarding MDOT-Tribal consultation, eligibility for at least four sites, along with a Finding of Effect. Consultation regarding eligibility and effect occurs between the lead agency and SHPO, rather than with consultations. You may want to contact Jon Axline, MDOT for further updates. 2

Thank you,

Stan Wilmoth

Stan Wilmoth, Ph.D.
Archaeologist

Encl.

File MDOT Hamilton - Lolo

US 93 HAMILTON TO LOLO, MONTANA
RESPONSES TO COMMENTS ON PRELIMINARY DRAFT EIS

Letter From: State Historic Preservation Office (SHPO)
Author: Stan Wilmoth, PhD
Dated: August 28, 1995

1. Discussion in Section 4.18 - Historical Resources has been corrected to reflect the coordination and consultation. References to responses on the consultation have also been included in Appendix D (see John Axline letters to Paul Pulz dated Oct 16 & 23, 1995).

2. Letters referred to in item #1 have addressed all of these concerns. Section 106 documentation and clearance is now complete and further consultation will not be necessary.

WRD/ch
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United States Department of the Interior

FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES
100 N PARK, SUITE 320
HELENA MT 59601

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
M.17 FHWA/Hamilton-Lolo

September 25, 1995

Joel M. Marshik, Manager
Environmental Services
Montana Department of Transportation
2701 Prospect Avenue
P.O. Box 201001
Helena, Montana 59620-1001

Dear Mr. Marshik:

The purpose of this letter is to provide the Montana Department of Transportation (Department) with the Fish and Wildlife Service's (Service) concurrence with the findings of the biological assessment for the proposed U.S. Highway 93, Lolo to Hamilton project (project #EIS NH 7-1(64)49) in Ravalli and Missoula counties, Montana, pursuant to 50 CFR §402.12(j). 1

The Service has reviewed the biological assessment for this project and concurs with the Department's determination that the proposal to improve the transportation system along the 34.2 miles (55.1 km) from Hamilton to Lolo by implementing one or a combination of several proposed alternatives will not likely adversely affect the threatened bald eagle (Haliaeetus leucocephalus) or the endangered peregrine falcon (Falco peregrinus). In addition, the Service does not anticipate any incidental take of listed species as a result of the proposed project. Therefore, pursuant to §402.13(a) of the 50 CFR, formal consultation is not required. 1

If, after public review and comment, the final project design is changed so as to have effects on threatened or endangered species other than those described in the June 7, 1994 biological assessment, a revised biological assessment will need to be prepared. The Service will then issue a letter of concurrence/non-concurrence on the revised biological assessment. 2

If you have questions regarding this letter, please contact Mr. Scott Jackson, of my staff, at the letterhead address provided above or by telephone at (406)449-5225. We appreciate your efforts to ensure the conservation of these threatened and endangered species as a part of your responsibilities under the Endangered Species Act, as amended.

Sincerely,

Kemper M. McMaster
Field Supervisor
Montana Field Office

SDJ/sdj

US 93 HAMILTON TO LOLO, MONTANA
RESPONSES TO COMMENTS ON PRELIMINARY DRAFT EIS

Letter From: US Fish and Wildlife Service
Author: Kemper McMaster
Dated: September 25, 1995

1. US Fish and Wildlife Service consultation and concurrence has been added to Section 4.12 - *Threatened and Endangered Species* as appropriate.

2. One of the mitigation requirements discussed in Section 4.12 - *Threatened and Endangered Species* is to continue close coordination with US Fish and Wildlife Service during the design and construction phases so that additional consultation and revisions to the Biological Assessment may be made as necessary.

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SEP 29 1995

ENVIRONMENTAL BUREAU

September 26, 1995

Ms. Julie Glavin
MPT Environmental Services
2701 Prospect Ave.
Helena, MT 59620

Dear Ms. Glavin:

I looked over the Environmental Impact Statement for Highway 93 South and didn't find anything that I knew was different from what was written. I checked the wetland, water resources, wildlife, floodplain, etc. and didn't see anything that needed changing.

Thank you.

Sincerely,

John T. Blaine
Resource Conservationist
N.R.C.S. Montana
5115 S. U.S. Hwy. 93
Missoula, MT 59801

U.S. Highway 93 Hamilton to Lolo Project Preliminary E.I.S.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII, MONTANA OFFICE
FEDERAL BUILDING, 301 S. PARK, DRAWER 10096
HELENA, MONTANA 59626-0096

Ref: 8MO

RECEIVED OCT 04 1995

September 29, 1995

Mr. Winston R. Dyer, P.E.
Forsgren & Associates, Inc.
P.O. Box 1032
15 Madison Avenue
West Yellowstone, Montana 59758

Re: Preliminary Draft Environmental Impact Statement, U.S. Highway 93, Hamilton-Lolo, Montana

Dear Mr. Dyer:

Due to a heavy workload at this time and other review priorities we have not been able to conduct a comprehensive review of the Preliminary Draft Environmental Impact Statement (DEIS) for the U.S. Highway 93, Hamilton-Lolo project, however, we did want to provide some input back to you regarding this preliminary DEIS within the requested time frame.

Due to limited resources and time our review focused on a general view of the preferred alternative, and wetlands, water quality and fisheries issues. Also, we have transmitted copies of the Chapter 3 and 4 sections containing the air quality impact analyses to staff in our EPA Regional Office in Denver for review. We are still awaiting their comments. We will provide any comments they make upon receipt. 1

We do not object to the preferred alternative. We agree that improvements to the highway along the existing corridor are preferred over new valley alignments. We particularly like the recommendation to construct park and ride lots and establish a transportation management association to manage the park and ride system and promote traffic reduction measures.

We believe that it would be environmentally preferable to utilize the Situational Access Control Policy (page 2-17)) to discourage development in environmentally sensitive areas such as wetlands and wildlife habitat. We also believe that the location and number of highway access points should be controlled to encourage environmentally compatible and coordinated development, and to encourage new development within existing communities and discourage development in rural agricultural and environmentally sensitive areas. 2

Printed on Recycled Paper

Letter From: US Environmental Protection Agency
Author: Steve Potts
Dated: September 29, 1995

1. Verbal input from the Air Quality staff in the Denver Regional office indicated satisfaction with the discussion in the air quality sections. A suggestion was made to include quantities of emissions. This was done by solving the EPA paved road dust emission equation for PM_{10} and listing the results in Section 4.4 - *Air Quality*.

2. The situational Access Control Policy referred to is actually a part of the recommendations given in Section 2.7 - *Preferred Alternative* in order to encourage densification of already developed areas and try to preserve undeveloped areas from developmental pressures. The proposed action also includes a combination of 5-lane and 4-lane sections that match well with these respective access control policies (more access for developed areas, less for undeveloped). The presentation in Table 2-7 recommends that use of 5-lane segments in urban developed areas and 4-lane undivided in less developed areas.

We want to commend Forsgren & Associates and the sponsoring agencies, the Federal Highway Administration (FHWA) and Montana Dept. of Transportation (MDOT), for the wetlands impact analysis, and for the wetland impact avoidance efforts. The wetlands impact analysis is one of the better ones we have seen. Many aspects are worthy of favorable note including:

* Fold out photos of the highway corridor identifying locations and boundaries of numbered wetland areas allowing evaluation of wetland impact avoidance/minimization measures.

* Table 3-6, summarizing wetlands information for the individual numbered wetlands sites within the highway corridor, including wetland type, function and value rating, acreage and milepost.

* Figure 3-6 showing color photos of typical wetland areas along the highway corridor.

* Table 4-4, summarizing impacts to wetlands by alternative, including the preferred alternative, by wetland type, function and value, and acreage.

* Figure 4-5, graphically depicting impacts of the preferred alternative by vegetative type, hydrologic source and function & value.

* Discussion of impact avoidance and minimization on pages 4-37, 38, 39.

The discussion of possible wetland mitigation ideas was also worthwhile. The specific display and quantification of impacted wetland acreage and function and value provided in Chapter 4 will be useful for developing an acceptable wetland mitigation plan. We note that a specific detailed wetland mitigation plan will need to be prepared and approved before the project receives a 404 permit. The mitigation plan will need to provide adequate compensation for the loss of the functions and values of the impacted wetlands at the numerous individual sites along the 34 mile highway corridor. You have gone a long way toward collecting the necessary wetland impact information needed to develop an acceptable wetland mitigation plan. 3

The wetland mitigation ideas that are discussed in the preliminary DEIS look promising. We agree with the statements on pages 4-40 and 4-43 that adequate performance criteria, monitoring methods, reports and schedules will need to be developed to assure success of wetlands mitigation. Attached for your information is a copy of a recent EPA publication regarding wetlands restoration and creation that was prepared for EPA by Dr. David Cooper of Colorado State University.

3 A statement has been added to the end of the "Efforts to Avoid or Reduce Impacts" subsection of Section 4.0 - *Wetlands and Waters of the United States* and in the permit discussion in Section 4.24 - *Implementation* to note that a specific detailed Wetland Mitigation Plan will need to be prepared and approved before the project receives a 404 Permit.

A factor that may be relevant to wetland mitigation that we noted from the discussion on page 4-42 of the preliminary DEIS regards the potential for wetlands to be affected by changes in groundwater hydrology that may result from land use changes in the Bitterroot Valley. The DEIS notes that the hydrology of the study area is very unique with the water table being higher in the summer than in the winter due to irrigation. The DEIS also notes that land use changes in the valley are causing agricultural land to be converted to development. It is possible that groundwater hydrology could change in the long term due to conversion of irrigated lands to development. Potential changes in groundwater hydrology may need to be considered when developing wetland mitigation plans. (4)

We note the significant vehicle-deer collision problem along the highway corridor and endorse the concept of constructing underpasses and using bridges instead of culverts to increase public safety and provide safer wildlife crossing opportunities (page 4-50).

We are concerned about the potential rerouting of One Horse Creek, Sweathouse Creek, and Mill Creek, and encroachments upon the Bitterroot River at Blodgett Creek, Big Bend, and the Bitterroot Side channel (page 4-51). Generally, we discourage rerouting of, and encroachment upon, natural stream channels since such disturbances can degrade aquatic habitat, increase erosion and flood intensity, and destabilize streams. We encourage careful evaluation of the need for channel encroachment and channel changes. (5)

We note that it is possible to design and construct a stable channel that incorporates aquatic habitat features into the channel design. A copy of the "Handbook for Reclamation of Placer Mined Stream Environments in Western Montana", Inter-Fluve, Inc., which describes complexities involved in planning, designing and constructing such stable biologically functional stream channels, is enclosed for your information and use. (6)

We are pleased to see that the new Silver Bridge alignment will include careful engineering design to avoid encroachment upon the Bitterroot River. It will be important to provide an adequate span for the new bridge that allows for necessary bedload transport and natural functioning of the floodplain. It should be recognized that the floodplain is part of the river and encroachment upon the floodplain is encroachment upon the river.

We note that it is stated on page 8 of the draft 404(b)(1) evaluation that "whenever possible construction schedules will be designed to not conflict with spawning and migration periods." Section 404 program requirements are that stream discharges; shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body; and shall not (7)

(4) Clarification has been added to the end of this paragraph to avoid areas where future development and land use changes may adversely affect groundwater hydrology. Also note the discussion in item a) emphasizes avoiding areas where development may occur and where groundwater resources are more secure.

(5) Preliminary design indicates it will not be necessary to encroach on the Bitterroot River. This has resulted from minor adjustment of the alignment to eliminate the need for encroachments at this location. Similar statements about potential rerouting have been clarified to talk about possible minor channel changes.

Proper use of mitigation measures and design features (i.e. use of extended guardrail and slope steepening) can do much to reduce the potential for impact on the channels mentioned. However, there are a few locations where the high degree of channel meander up and downstream from the road crossing location precludes avoiding impacts altogether (stream briefly parallels highway).

(6) Reference to the handbook has been added in the mitigation discussion for Section 4.9 - *Wetlands and Waters of the United States.*

(7) The discussion in the Draft 404(b)(1) Evaluation has been clarified to note it will be a requirement to schedule construction so as to avoid conflict with spawning and migration seasons.

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occur in spawning areas if practical alternatives exist. We hope that every possible effort will be made during design and construction to prevent impacts to spawning and migration of aquatic life.

I hope these comments will be of some value in your effort to finalize the DEIS. I regret that the current workload and other priorities preclude a more comprehensive review of the preliminary DEIS at this time. If you have any questions please feel free to contact me in Helena at (406) ~~449-5486~~ 441-1140 ext. 232.

Sincerely,

Stephen Potts

Stephen Potts
NEPA Coordinator
Montana Office

Enclosures

cc: Jeff Ryan, MDEQ-WQD, Helena
Joel Marshik/Julie Glavin, MDOT, Helena
Mark Leighton, MDOT, Helena
Dale Paulson, FHWA, Helena
Bob McInerney, COE, Helena
Bob Nebel, COE, Planning Division, Omaha
Bill Geiss/Arlene Butler, EPA, Denver, 8WM-EA
Kevin Shelley, USFWS, Kalispell
Jeff Herbert, MDFWP, Helena

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

RECEIVED OCT 10 1995

MARC RACICOT, GOVERNOR

836 FRONT STREET

STATE OF MONTANA

(406) 444-3454
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PO BOX 200901
HELENA, MONTANA 59620-0901

October 3, 1995

Winston R. Dyer, PE
Forsgren Associates/P.A.
P.O. Box 1032
West Yellowstone, MT 59758

Dear Mr. Dyer:

RE: Hamilton-Lolo Preliminary Draft Environmental Impact Statement

After reviewing the Preliminary Draft Environmental Impact Statement (PDEIS), the Air Quality Division (AQD) would like you to consider the following comments and suggestions.

Section 1.7 Social/Economic Demands

Land Use

AQD agrees with the drafting of the Ravalli County land use plan and policy which will mimic Missoula County's regulations. If these regulations help to ease "strip growth" development, the PM10 emissions on the highway could be greatly reduced. AQD believes that PM10 emissions do not only occur from sanding material placed on the roads for traction purposes, but that a significant amount of material is also "carried" from unpaved shoulders and parking lots on to the paved roads. AQD strongly agrees with the statement, "Any proposed improvements to US Highway 93 should include access control policies that will compliment local land use plans and Ravalli County's future land use plan." (1) (2)

Although it is true that the "...traffic study and land use reports suggest that the population is already growing at a maximum rate even with existing inefficient and congested transportation facilities...resulting from a robust local economy, aesthetic appeal, and other market forces...", AQD believes that this maximum rate of growth could increase even more from commuter traffic once the proposed transportation improvements are completed. For instance, it is AQD's belief that a commute from Hamilton to Missoula will be much more appealing once the project is complete. (3)

Letter From: Montana Dept of Environmental Quality - Air Quality Division
Author: Gretchen Bennitt
Dated: October 3, 1995

(1) Incorporation of access control policies that will compliment local land use plans (especially those to control or limit strip growth) has been added as a recommendation under the air quality mitigation section (4.12).

(2) A sentence indicating that particulate matter could be brought onto the facility from unpaved shoulders and parking lots has been added to the general impacts discussion.

(3) The Traffic Study, Land Use Report, and other studies conducted for the EIS all indicate that the projected growth of the area and corresponding increase in traffic will occur regardless of whether improvements to the transportation facility are made. Indeed, both the population projections and the growth projections have been made on statistical analysis of past growth in the area, which is completely independent of the condition of the transportation facilities.

The EIS has addressed the issue of potential secondary growth in the "Future Population Growth" subsection of 3.13 - *Social*, 4.13 - *Social*, and 4.15 - *Land Use*. Discussion indicates that such growth commonly occurs when new transportation facilities are constructed in areas that have none or are constructed in such a manner as to attract traffic away from other possible routes in the area. National experience has shown that where transportation facilities already exist and where there are no other routes or choices for alternative travel, then improvements to facilities generally affect only the rate of growth depending on whether access is improved or denied.

Section 4.15 - *Land Use* discusses the effects of an improved commute in the section on cumulative impacts. This discussion points out that there is a physiological "maximum" commute time and the net effect of the proposed action could be to push development pressure further southward in the project corridor than presently exists due to the reduced commuting time. Statistical information from surveys is then discussed that predicts a 10 km (6.2 mile) extension of the commuting range which would densify existing residential development in this "bedroom" community sector and possibly accelerate pressure to convert undeveloped land to residential use.

Discussions in the land use section point out that while an improved facility may have an impact on the rate of growth and the areas in which it is expected to occur, transportation improvements will not create additional growth beyond that projected for the "no action" alternative.

Lastly, discussions with local planning officials regarding the growth issue have indicated a definite expectation that growth in the area will hit a maximum ceiling beyond which it is non-sustainable. Discussion in the future land use section of Section 4.15 - *Land Use*, sets forth the anticipated checks and balances to growth resulting from availability of construction, labor, materials, and also increases in land values that result from strong growth. The planning office feels these factors will help control growth to keep it within

Additionally, this increase in commuter traffic will likely increase the congestion at the Brooks/South/Russell Intersection in Missoula, the maximum concentration site for the Missoula CO nonattainment area. (4)

Section 3.4

Standards and Regulations

The statement "Such [nonattainment] areas receive special recognition and tighter air quality standards..." is incorrect. Air quality standards do not change as a result of designation. (5)

Existing Air Quality Standards

The statement "No current air quality monitoring station has been established along US 93 in the Hamilton to Lolo project corridor. The closest stations are located northward in Missoula." is incorrect. AQD currently is monitoring for particulate in Stevensville. Although the monitors are not directly on US 93, they are located less than one mile from the highway. (6)

Section 4.4

The statement "PM10 emissions would increase in proportion to the amount of particulate matter deposited on the roadway surface." is incorrect in that although the amount of material deposited on the road is a factor that affects the emissions of particulate, an increase in PM10 emissions is proportionate to traffic volumes, as is demonstrated by the paved road dust emission equation in EPA's publication of the Compilation of Air Pollution Emission Factors (AP-42): (7)

$$EF = k\,(SL/2)^{0.65}\,(W/3)^{1.5}$$
$$= \text{grams of PM10/VKT}$$

Where

EF	=	particulate emission factor (g/VKT)
k	=	base emission factor for particle size range and units of interest (4.6)
SL	=	road surface silt loading, (gm/m^2)
W	=	average weight (tons) of vehicles travelling the road, 3 English tons
VKT	=	Vehicle Kilometers Travelled.

This equation illustrates that although the amount of sanding material deposited on the roadway does contribute to PM10 emissions, any increase in vehicular traffic (represented by VKT) will proportionately increase PM10 emissions.

the range projected in the EIS whether or not improvements to transportation facilities are made.

4 The foregoing discussion indicates traffic into Missoula is expected to increase whether or not the proposed action is implemented. Coordination between this EIS effort and MPO efforts in Missoula to establish air quality plans has occurred. Specifically, expected traffic volumes have been given to the MPO for inclusion in the air quality modeling for regional emissions for the transportation improvement program (TIP). Determination will then be made whether the TIP conforms to the current State Implementation Plan for air quality.

Impacts from traffic from the Bitterroot are already in Missoula and will continue whether or not improvements to transportation facilities in the Bitterroot are made. However, these effects are being accounted for in Missoula's regional air quality modeling and are therefore being addressed. At great expense, Missoula has already identified several feasible ways to address the problems at Malfunction Junction, none of which have included any discussions on a moratorium of residential development or transportation improvements south of Missoula.

Malfunction Junction will be negatively impacted by growth in the area wherever it occurs, simply because of its central location. Until something is done at that intersection to improve traffic flow or provide for alternate routes (improvements to Reserve Street are already helping), all trips in this area of Missoula will continue to flow through the intersection regardless of what improvements are made to any of the roads that lead to it.

5 Corrected as noted.

6 Corrected as noted and revised to discuss new stations and limited data currently available.

7 Corrections have been made to the discussion to clarify this information. Note this was correctly stated in the last sentence of the second full paragraph on this page and also in the last sentence on the page. The equation has been solved for the present and future cases (note traffic projections are independent of alternatives) and the results have been added to Section 4.4 - *Air Quality*.

Specific Impacts

It is stated that the lower speeds associated with higher congestion will reduce the ability to "flush" PM10 matter to the sides of the roadway; thus resulting in an increase in PM10 emissions. This statement is incorrect since the "flushing" of material from roads is what causes the re-entrainment of PM10 in the first place. It will make no difference if it happens quickly or over a longer period of time. The speed of a vehicle on a paved road has no bearing on the amount of PM10 re-entrained into the air as demonstrated with the above equation. 8

AQD must disagree with the statements "PM10 emissions would be expected to be similar for all alternatives...", and "Build alternatives will result in reduced emissions through a reduction of congestion and smoothing of traffic flow." Although it is true that CO emissions will be reduced in the project corridor with the reduction of congestion, any increase in vehicular traffic (VKT) will increase the emissions of particulate. 9

AQD agrees with the short term construction impacts and highly recommends the construction mitigation discussed in the PDEIS.

Cumulative Impacts

AQD must disagree that proposed improvements would not adversely impact CO and PM10 emissions in the Missoula PM10 and CO nonattainment areas. AQD must also disagree with the statement, "...actions to reduce the amount of traffic on the highway and reduce congestion afforded by build alternatives will reduce CO and PM10 emissions in the Bitterroot Valley, which may have a cumulative positive effect on concentrations in the Missoula area." As discussed earlier, with a probable increase in commuter traffic from Hamilton to Missoula, the CO emissions in Missoula at Brooks/South/Russell Intersection may increase. In addition, as stated above, AQD does not believe that the PM10 emissions will decrease with an increase in vehicular traffic. 10

Conclusion

Any completed project which will smooth out the traffic flow, and reduce stopping and idling time will also reduce the amount of CO emissions from transportation sources. In this respect, AQD supports your efforts to upgrade the Montana highway system. However, the following items should be noted in the final EIS: 11

1) PM10 emissions will increase proportionately with an increase in vehicle traffic;

2) The maximum rate of growth in the project corridor could increase even more than land use reports predict if congestion in the project corridor is eased;

3) With the relief of congestion in the Bitterroot Valley, it may become

8 Discussions of "flushing" have been removed from the document.

9 Discussion clarified to include CO only.

10 This section has been reworded to more accurately represent expected cumulative impacts. See also discussion under item 3 and 4 above.

11 These conclusions have been addressed by the discussion on the individual items noted above.

WRD/ch
92100\bennitt.rep

more appealing for a larger population to live in the Bitterroot Valley and commute to Missoula. CO emissions could increase within the

Missoula CO nonattainment area (specifically, the CO maximum concentration area) if there is an increase of commuters from project corridor area to Missoula.

4) Any land use policy which will mimic Missoula County's regulations to help ease "strip growth" development will decrease the deposition of additional particulate matter on the roads from unpaved shoulders and parking lots.

Thank you for allowing AQD to comment on the preliminary draft EIS. If you have any questions about these comments, please contact me at (406) 444-3454.

Sincerely,

Gretchen Bennitt

Gretchen Bennitt, Supervisor
State Implementation Plan

GB:kt

DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY DIVISION

MARC RACICOT, GOVERNOR

COGSWELL BUILDING
1400 BROADWAY

STATE OF MONTANA

(406) 444-2406
FAX (406) 444-1374

PO BOX 200901
HELENA MONTANA 59620-0901

October 6, 1995

Mark Leighton
Montana Department
of Transportation
PO Box 201001
Helena, MT 59620-1001

Re: Preliminary Draft Environmental Impact Statement (EIS) for MDT Hamilton-Lolo Project

Dear Mr. Leighton:

The Department of Environmental Quality (DEQ) Water Quality Division has reviewed the above referenced EIS. Based on the scope of the project, it appears that coverage will be required under the General Discharge Permit for Storm Water Associated with Construction Activity. Other permits may be required by the Water Quality Division depending on the contractor's activities. 1

I appreciate the opportunity to comment concerning MDT projects.

Sincerely,

Roxann Lincoln

Roxann Lincoln CPSS
MPDES Storm Water Coordinator

"AN EQUAL OPPORTUNITY EMPLOYER"

Letter From: Montana Dept. of Environmental Quality - Water Quality Division
Author: Roxann Lincoln
Dated: October 6, 1995

1 Permit requirements were clarified in the "Permit" subsection of Section 4.24 - *Implementation*.

WRD/ch
92100\lincoln.rsp

Montana Department of Fish, Wildlife & Parks

RECEIVED OCT 10 1995

3201 Spurgin Road
Missoula, MT 59801
September 29, 1995
406-542-5500

Mr. Winston R. Dyer, PE
Project Manager
Forsgren Associates Inc.
PO Box 1032
West Yellowstone, MT 59758

Dear ~~Mr. Dyer~~ Dick:

I have reviewed the preliminary draft Environmental Impact Statement for the U.S. Highway 93 Hamilton to Lolo project.

I found section 3.11 regarding the fisheries to be accurate and well done. The only error I saw was the use of an apostrophe s on the end of Clark referring to the Clark Fork River on page 3-40. (1)

Section 4.11 is also well done. The only slight correction would be to indicate that FWP has in the past considered doing something to stabilize the river near Blodgett Park but is not actively pursuing anything there at this time. (2) On page 4-53 paragraph 3 "ridges of streams" should probably read reaches of streams. (1)

The list of mitigation measures for reducing the adverse effects of construction on fish populations is good. We will deal with most of those issues in our Stream Protection Act permitting process. The new alignments at Bass Hill, Blodgett Park and the Silver Bridge are improvements, in my opinion.

The only question I have at this time is, what is the fate of the old silver bridge. In particular, I believe the abutments and center pier should be removed. (3)

Finally, I agree with the preferred alternative that was selected. The process has been fair and open and I believe the EIS reflects sensitivity to many of the concerns that surfaced during the process. You should be commended for doing an excellent job. I hope the remainder of the process goes well.

Sincerely,

Dennis Workman

Dennis Workman
Fisheries Manager

US 93 HAMILTON TO LOLO, MONTANA
RESPONSES TO COMMENTS ON PRELIMINARY DRAFT EIS

Letter From: Montana Fish, Wildlife and Parks
Author: Dennis Workman
Dated: October 10, 1995

(1) Typographical error corrected.

(2) Discussion has been changed to indicate past consideration, but no further active pursuit.

(3) The Silver Bridge is approved for removal from the Historical (Section 106) perspective and is included along with the recommended improvements. The recommendation to remove the abutments and center pier has been added to the mitigation section of Section 4.11 - *Fish*.

WRD/ch
92100\workman.rsp

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978
October 16, 1995

REPLY TO
ATTENTION OF
Planning Division

Mr. Joel Marshik, Manager
Environmental Services
Montana Department of Transportation
2701 Prospect Avenue
Helena, Montana 59620-1001

Dear Mr. Marshik:

Enclosed are comments on the Preliminary Draft Environmental Impact Statement which was prepared for the Hamilton to Lolo segment of highway U.S. 93 in preparation for improvements to the roadway.

This is a very good document which has dealt with issues quite thoroughly. The wetlands section is well presented with good detail, and is well illustrated with tables, photos and graphs. In addition to our substantive comments we have noted some of the typographical errors that were found, hoping that this will also be helpful.

If you have any questions, please contact Dwight Olson, (402) 221-4628.

Sincerely,

Candace M. Thomas
Chief, Environmental Analysis Branch
Planning Division

Enclosure
Copy Furnished:
Mr. Winston R. Dyer
Forsgren & Associates, Inc.
15 Madison Avenue
West Yellowstone, Montana 59758
CEMRO-OP-R
CEMRO-OP-RO-MT

HAM-LO EIS COMMENTS:

1. Title Page (second sheet): This EIS does not contain a "DRAFT SECTION 404 PERMIT". It does contain a draft 404(b)(1) evaluation. (1)

2. Summary, first line: "...Section 404**(b)(1) Evaluation.** (1)

3. Page S-4: This section, detailing "Major Environmental Impacts" discusses only one biological issue, but includes many economic, social, and transportation issues. Are there more natural resource issues, such as deer and wildlife kills, fisheries issues, water quality impacts, etc? (2)

4. Page S-6, second line: Reference is made to a "Biological Assessment". We request that this document contain a draft Biologic... Assessment regarding any potential effect to threatened or endangered species. Having this document available in the draft EIS will give the Fish and Wildlife Service the opportunity to respond with a biological opinion in time for the final EIS, and the permit decision can proceed in a timely manner. (3)

5. Comment: Since this is a scientific/NEPA document, would it be more appropriate to use "Scientific Format" for citing references (author and date placed in text), and all references placed in one listing rather than a list for each chapter? (4)

6. Page 1-4, 5th para: "...summarized and compiled..."? (5)

7. Page 1-6, Figure 1-3: The vertical axis is labeled "Average Daily Traffic **in thousands**". I then interpret the bar graph to indicate that average daily traffic in the Florence to Lolo area to be 12 million 800 thousand vehicles (12,800 x 1,000 = 12,800,000). (5)

8. "Need" is well demonstrated, with the possible exception of the economic growth issue that is suggested on page 1-1. (6)

9. Page 1-16, "Public Demand", second para: "...local and governments..."? (5)

10. Page 1-27, Item 8: Is any additional information available. No one can look this up. (7)

11. Page 2-5, 6th para: "...Florence were/was proposed." (It would be helpful to run a "grammar-check" on the entire document) (5)

12 Page 2-21, under "**General Considerations for Selection**": "...the ability to avoid **negative** impacts" (5)

13. Page 2-22, last full para, 5th line: "...**and** expand..." (5)

14. Page 2-23, 3rd para, third line: "...communities due to **its**..." (5)

US 93 HAMILTON TO LOLO, MONTANA
RESPONSES TO COMMENTS ON PRELIMINARY DRAFT EIS

Letter From: US Army Corps of Engineers
Author: Candace Thomas
Dated: October 16, 1995

1. The document had erroneously used the words "permit", "analysis", and "evaluation" interchangeably. The entire document and the 404 evaluation section have been clarified to use the proper term "evaluation".

2. Discussion has been added to this section concerning impacts to habitat areas, possible barriers to fish and wildlife movements, and continuance of the deer kill problem. As noted in Chapter 4 - Environmental Consequences, most of the biological issues other than those summarized in this listing do not have sufficient impact or consequence to merit listing as a "major" impact.

3. The Biological Assessment has been received and reviewed by the US Fish and Wildlife Service. Please note the concurrence given in the letter now contained in Appendix D dated September 25, 1995 and signed by Kemper McMaster.

4. A request often mentioned during the public involvement and scoping processes was that this document be written and presented in a manner useable and understandable by the general public. There is a high degree of interest in the area about the project and this document will likely be read by more members of the general public than any other similar document anywhere in the State. As a preference to making the document more public-friendly, the references were moved to the end of the chapter where they are available for those who need or desire to utilize such information.

5. The typographical error has been corrected and/or clarified.

6. Additional discussion of the need for improvements with relationship to economic growth has been added to the "Economic Concerns" subsection of Section 1.4 *Social and Economic Needs.*

7. This manual is available from McTrans Center for MicroComputers in Transportation Engineering (904-392-0378). Be sure to clarify you need the manual, not the program. Alternately, you can write directly to: Transportation Research Board, National Research Council, 2101 Constitution Ave NW, Washington, DC 20418.

15. Page 2-29, footnote 8: Check wording of title. (5)

16. Page 2-25, 6th para, and elsewhere: verify use of "predominate" and "predominant" as well as "dominate" and "dominant" (page 3-28, 4th line). (5)

17. Page 2-26, Table 2-7: Mileages do not add up to total. Total improved miles is 34.2 16.8 + 14.5 = 31.3. Mp 73.0 - mp 67.9 = 5.1 miles, and mp 53.9 - mp 53.4 = 0.5 miles. Thus, 4 lane, undivided = 19.7. (5)

18. Page 3-14, top: "...sanitary **refuge**..."? (5)

19. Page 3-29: Excellent photos

20. Page 3-37 Narrative says table 3-8 "presents the increase in deer population", but the discussion and numbers presented suggest it may be a graph of deer kills. How does either jibe with " 1000 deer are killed each year in the Valley..." (8)

21. Page 3-46, 2nd para under Table: "dissention" vice "distention". (5)

22. Page 3-71, 3rd para, first sentence: "During the late pre-historic period..."? (5)

23. Page 3-71, last sentence: "quartzite" vice "quartz site". (5)

24. Comment: Headings in Chapters 3 and 4 parallel one another at the major heading level, but several items are discussed in chapter 4 that are not discussed in chapter 3. Any item discussed in Environmental Consequences should also be germane in the Affected Environment chapter (9)

25. Comment: In chapter 4, it would be helpful to **bold** the various alternatives that are being considered This would facilitate rapid review and aid in following a given alternative through the chapter. (10)

26. Page 4-11, first full sentence: Does a reduced ability to flush emissions from the roadway actually increase the emissions from vehicles? Seems emissions would be more concentrated for those persons present on the roadway, but only because of less mixing taking place. Earlier in this paragraph it states that PM/10 emissions would not increase under stop-and-go operations. (11)

27. Page 4-12, first item under "Mitigation": Spraying vice spaying? (5)

28. Page 4-20, 6th printed line from bottom: "refuge"? (5)

29. Page 4-28, 4th para, 2nd line: "traffic **congest**"? (5)

30 In some cases the page number given in the table of contents does not match the text; eg , Preferred Alternative discussion begins on page 2-21 rather than 2-20. (5)

(8) The first full paragraph on page 3-37 has been clarified to show that the 1000 deer killed and $700,000 of property damage annually occur throughout the entire Bitterroot Valley and the graphs presented track killed deer removed from the highway within the project corridor.

(9) Some sections of chapters 3 and 4 have been rearranged in order to have the chapters track each other sequentially as much as possible. Some items in Chapter 4 do not lend themselves to appropriate inclusion in Chapter 3 such as predictions of future population, TDM, etc. These have been moved to better locations in the document. The items contained in Chapter 4 under Section D - *Miscellaneous Considerations* include discussion of short-term uses and impacts versus long-term benefits, energy and commitment of resources, implementation of the proposed action, and summary information on impacts and mitigation for convenience of review really have no parallel in Chapter 3.

(10) Two tables are now included in Chapter 2 (2-11 and 2-12) that help to quickly review and compare alternatives at a glance. Table 4-19 also gives a relative comparison of alternatives. Significant efforts have been made to organize and present material in the EIS without confusion in order to make it a document more useable and friendly to the public; thus the alternatives have been separated out into distinct paragraphs but need not be shown in bold.

(11) Reference to "flushing" of particulates have been removed from the document and clarification has been made throughout the section on air quality impacts in accordance with the comments of air quality reviewers (see Montana Dept of Environmental Quality, Air Quality Division review letter dated Oct 3, 1995, and associated responses).

7

The centerline, however, would be relocated toward 24RA443, 24RA447, and 24RA453. Although they would be located within the proposed R/W, the cairns are not situated within the proposed construction limits. We don't feel testing of these three cairn sites is necessary. Instead, we will draft a special contract provision for to restrict activity in the vicinity of the three cairn sites to the designated construction limits. The Kootenai - Salish will also be consulted prior to the finalization of the plans. (3)

We are requesting your concurrence for the above items. If you have any questions, please contact me at 444-6258.

Jon Axline

Jon Axline, Historian
Environmental Services

cc: James Weaver, P.E., Missoula District
Carl Peil, P.E., Preconstruction Bureau
Joel Marshik, P.E., Environmental Services
Gordon Stockstad, Resources Section
Patricia Hewankorn, Kootenai Cultural Committee
Tony Incashola, Flathead Culture Committee

CONCUR
MONTANA SHPO
DATE 12-18-95 SIGNED [signature]

(4)

(4) Note concurrence of SHPO by signature. Receipt of these concurrences (see also John Axline letter of Oct 23, 1995) satisfies all Section 106 Historic and Cultural Requirements for the proposed action. Further action will not be required unless changes in the proposal are made or discovery of unknown resources occurs during implementation of the recommended improvements.

WRD/ch
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Montana Department of Transportation
2701 Prospect Avenue
PO Box 201001
Helena MT

Marc Racicot, Governor

RECEIVED
OCT 3 1 1995

OCT 2 5 1995

MASTER FILE
COPY

October 23, 1995

Paul Putz
State Historic Preservation Office
1410 8th Avenue
P.O. Box 201202
Helena, MT 59620-1202

Subject: NH 7-1(52)49
Hamilton - Lolo
Control No. 2315

Enclosed is the Determination of Effect for the above project. We have determined that the proposed project would have **No Effect** to the NRHP-eligible Bitterroot Branch of the Northern Pacific Railroad (24MO359/24RA271) and to Feature 1 of the Wilkerson Place (24RA460). The project would have **No Adverse Effect** to the Conlon Homestead (24MO357) and Feature 20 of the Dunbar Sawmill (24RA459). We request your concurrence. 1

If you have any questions, please contact me at 444-6258.

Jon Axline

Jon Axline, Historian
Environmental Services

Enclosure

cc: James Weaver, P.E., Missoula District Engineer
Carl Peil, P.E., Preconstruction Bureau
Joel Marshik, P.E., Environmental Services
Gordon Stockstad, Resources Section

CONCUR
MONTANA SHPO
DATE 10-30-95 SIGNED Stan Wilmoth 2

Equal Opportunity Employer

TOTAL P.02

US 93 HAMILTON TO LOLO, MONTANA
RESPONSES TO COMMENTS ON PRELIMINARY DRAFT EIS

Letter From: State Historic Preservation Office (SHPO)
Author: Jon Axline to Paul Putz
Dated: October 23, 1995

1 The determination of effect has been duly noted in appropriate areas of the text and also in Table 4-15.

2 Note SHPO's concurrence by signature.

WRD/ch
92100\axlin1.rsp

31. Page 4-53, second bullet: "reaches" vice "ridges"
Last sentence on page: "areas" vice "area". 5

32. Appendix B, 404(b)(1) evaluation, page 8-40, E.5: The last sentence qualifies MDT's intentions with "whenever possible". Significant effort must be expended to make it possible to avoid impacts on spawning activity. 12

33. App. B, page 18, item 3: "significantly". 5

Comment: Is the "Selected Plan" the "Environmentally Preferred Plan"? 13

12 The 404(b)(1) Evaluation has been clarified on page 8 of 40 to read that construction schedules will be specified to not conflict with spawning and migration seasons (mandatory).

13 The selected plan is also the "environmentally preferred plan" in that it is the least environmentally damaging that meets the stated purposes and needs for improvement. Discussion to this effect has been added in the 404(b)(1) Evaluation, in the discussion of the preferred alternative on page S-3 and in Section 2-7 - *Preferred Alternative.*

WRD/ch
92100\thomas rsp

RECEIVED
OCT 20 1995
ENVIRONMENTAL BUREAU

October 16, 1995

Paul Putz
State Historic Preservation Office
1410 8th Avenue
P.O. Box 201202
Helena, MT 59620-1202

Subject: NH 7-1(52)49
Hamilton - Lolo
Control No. 2315

On February 4, 1994, your office submitted comments concerning the above project's cultural resource report. Because of the completion of preliminary plans and the preliminary draft EIS, we are now able to address those comments.

Because of the existing Irrigation Ditch Programmatic Agreement, we are not required to record the two irrigation ditches crossed by U. S. Highway 93. Although both facilities are shown in the Ravalli County Water Resource Guide, they are unnamed and do not appear to be a part of any larger named system. Stipulation 4(d) of the 1991 PA states that "Irrigation ditches not identified by name in the appropriate Montana Water Resources Survey publication will not be considered under any circumstances." An abbreviated Irrigation Ditch site form is not necessary and they will not be considered further. 1

In 1993, the MDT made no recommendation for the NRHP eligibility of the Bitterroot Pea Factory (24RA461). The consultant recommended the site potentially eligible under Criterion D. Preliminary designs indicate that the proposed centerline would be relocated 74-feet further away from the site than it is now (it is 51-feet from the factory). The site is located outside the proposed Right-of-Way boundary and well outside the proposed construction limits for the project. It is our belief, therefore, that no Determination of Eligibility is necessary because the property is not located in the proposed impact area. If the alignment is changed in the future, we will reassess potential impacts to the site. 2

The consultant was denied access to 24RA463 by the property owner. The preliminary plans indicate that the existing alignment would be retained at this location. It is, consequently, outside the Area of Potential Effect and no Determination of Eligibility is necessary for 24RA463. Again, if the alignment is relocated in the vicinity of the property, we will again attempt to gain access to it. 2

The completion of the preliminary plans has also provided an indication of potential impacts to the six rock cairn sites located within the project area (24RA443 - 447 and 24RA453). We believe no archaeological testing is necessary for 24RA444, 24RA445, and 24RA446 since the proposed centerline would be realigned away from the cairns. There would be no encroachment on the sites as a result of the project and all are located well outside the proposed construction limits. 3

Letter From: State Historic Preservation Office (SHPO)
Author: Jon Axline to Paul Putz
Dated: October 16, 1995

1. Ditches were not discussed in the EIS since they fall under the existing Irrigation Ditch Programmatic Agreement; however discussion to this effect has now been added.

2. This information has been duly noted and included in the appropriate Section of 4.18 - *Historic Resources*.

3. This information has been duly noted and included in the appropriate Section of 4.19 - *Cultural Resources*.

APPENDIX E

INDEX

INDEX